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ABSTRACT

Designed to provide instructional technologists, policy makers, and administrators with an overview of the basic principles of distance education, this booklet comprises eight chapters: (1) Introduction; (2) A Selective History; (3) Components of Distance Education Systems; (4) Organizational Options; (5) Instructional Technologists and Staffing for Distance Education; (6) Economics of Distance Education; (7) Distance Education at Home and Abroad (describing selected examples of distance education projects); and (8) Present Issues in Distance Education (including political, legal, and regulatory problems; research and development; new applications; and organization and leadership). A list of abbreviations and acronyms, a bibliography containing 21 references, and a list of general references to centers of activity in distance education are provided. (GL)

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DISTANCE

EDUCATION

About the Author

David Giltrow's experience with distance education started in 1953 when, as a high school student, he enrolled in the University of Michigan's first televised adult education course in basic physics on WXTZ-TV. He later graduated from Michigan and served as a volunteer photographer and film maker in community development and adult education in Tanzania, East Africa. His graduate degrees are in instructional technology and comparative education from Syracuse University.

After four years with the Chicago City Wide College as an administrative dean for media research and production, Dr. Giltrow became an independent consultant and researcher in 1977, specializing in distance education, adult and continuing education, and application of instructional technology in developing nations. Later appointments included four years as adjunct associate professor with Utah State University and the University of Dar s Salaam, Tanzania, where he directed a USAID/USU project to develop a continuing education center for agriculture. In 1984, he led a consulting team which helped plan the Open University of Indonesia. This publication was completed while serving as a Visiting Scholar at the UUI in Jakarta. David Giltrow is based in Santa Fe, New Mexico.

Author's Acknowledgment

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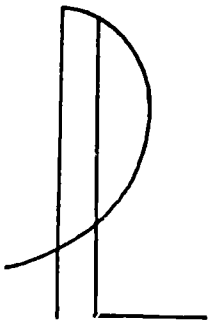

Briefs on Topics for all AECT members

Presidents' Library Acknowledgments

Without the leadership and dedication of Mendel Sherman, the editing abilities of Bob Heinich, and the desk top publishing skills of Bob Hale, the first publication of the Presidents' Library would not have been possible.

Preface

This booklet, Distance Education by David Giltrow, is the first of a projected series of publications commissioned by the AECT Past Presidents Council. The goal of the Council is to provide to AECT members publications that are timely, brief and inexpensive.

Over the years, the Non-Periodic Publications Committee has done an excellent job of keeping the membership informed through a publication program that emphasizes comprehensive treatment of selected subjects. The program of the Past Presidents establishes a different line of publications. They want to make available a series of low cost pamphlets that would treat each topic in a brief, popular style. The Past Presidents Council will work closely with the Non-Periodics Publications Committee when selecting the topics for the series so that the two publication programs make the best use of limited resources.

The Past Presidents Council of AECT is the only group with permanent membership, enriched each year by the addition of the outgoing president of the Association. Its collective experience extends from today back into the 1930s. There is more corporate memory in this Council than anywhere else in the Association. This gives the group a unique perspective.

The first publication in the series, Distance Education, seemed to the Past Presidents to be an especially timely topic. All AECT members have a particular stake in the rapidly growing area. Distance education cannot exist without our field and policy makers need to know that it functions best with our full and active participation.

We look forward to future AECT Presidents Library publications and welcome suggestions as well as financial support from all who wish to contribute. The number of topics that can be treated each year will depend upon available funds. A revolving fund has been established with the ECT Foundation. Income from sales of the publications and contributions from members will be the primary sources of funds for the fund.

Mendel Sherman
Chairman, Editorial Board

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CHAPTER 1. INTRODUCTION

Distance education once entered traditional educational premises by the back door. Few believed that television's cold images or correspondence courses' pages of black ink could match a live performance by a warm-blooded teacher, however uninspiring he or she might be. But the lure of flexible study time, viewing a lecture at home, and fitting credit toward a degree, diploma, or certificate into a hectic schedule attracted motivated students.

Over the past 30 years, millions of people worldwide have used education at a distance because it can provide a useful alternative to conventional classroom-based education. While generally catering to adults--at home, on the job, in the military, in prisons and mental hospitals--distance education is on the threshold of serving a new audience in the school systems of the nation. Educators are discovering what college students have been doing for years: mixing conventional education with distance education to accelerate and expand individual academic programs.

The success of distance education programs is directly related to the use of systematic instructional design and communication technology. Ironically, as explained in Chapter 2, instructional technologists seldom played a leading role in the early experiments using media in distance education. However, the number of distance education panels at recent AECT meetings suggests the increasing involvement of instructional technologists in distance education.

This booklet is intended to provide instructional technologists, policy makers, and administrators with an overview of distance education's basic principles. It is hoped that an understanding of these principles can make elements of distance education part of the tool kit that professional educators and policy makers use when solving educational problems.

DEFINING DISTANCE EDUCATION

Defining an educational strategy which has a seemingly endless number of variations is not easy. For the sake of simplicity, though not universal agreement, we'll arbitrarily use a brief definition from 1983 adopted by ERIC (1986), the educational database with one of the largest and most accessible literature collections on distance education:

> "Distance education is education via the communications media (correspondence, radio, television, and others) with little or no classroom or other face-to-face contact between students and teachers." (p.66)

Note that the definition above would exclude many programs called "independent study". In such programs, guidance is provided by a faculty member but the use of "communications media" is lacking or incidental to the individualized program which often consists of guided readings, periodic assignments, and tutorials.

DISTANCE vs. CONVENTIONAL EDUCATION

For educational problem solvers, clearly understanding the major differences between distance education and conventional, classroom-based education is perhaps more important than having worked through a global definition of distance education. The obvious difference is in the "distance" between a teacher and a student--separation by spatial distance and often separation in time between the creation of teaching materials and their use by a learner, perhaps late at night when the kids are tucked in bed.

Many successful USA distance education programs started from a pragmatic need to solve an immediate, specific local educational problem in a cost-effective way. This contrasts with distance education institutions abroad where a national policy sometimes allowed advanced planning and theorizing about the nature of organizations and how best to provide distance education. Neither result is better than the other--they are usually solving quite different problems by applying similar methods.

Basic level distinction. For an example of the distinction between conventional education and a simple form of distance education,

we'll use a composite description of how several USA engineering programs started using distance education in the 1960s.

A professor is lecturing to a group of advanced engineering students in an ordinary classroom. A progressive company would like its engineers to take the course, but can't release them from work. The employees live too far from the campus for convenient commuting. With little effort and virtually no cost, we can provide the basic element for distance education by linking the campus to one or more remote classrooms via a telephone line and speaker telephones in each classroom. From a roster of names, the professor can ask questions of students in the remote classrooms in virtually the same manner as those in the primary classroom.

Note that at this basic level, the teacher does not have to greatly change conventional teaching habits. The teaching event is conducted live. The use of visuals is limited to those which have been made available at the remote classrooms through handouts or duplicate overhead transparencies. The textbook remains the same; a study guide is not required.

Adding elements. Building in more distance education elements is a natural progression. For example, we can introduce a correspondence element--quizzes, exams, papers and problem sheets are completed by the distance students, mailed to the teacher for marking, and returned by mail with comments and corrections. Perhaps a teaching assistant is added at the remote site to help clarify points after the lecture, coordinate any administrative paper work such as course registration, and mark the quizzes, problem sheets, and exams.

The professor can establish telephone hours for the remote students--a substitute for the office hours used by the ordinary classroom students. A second phone line can be installed to use slow-scan television equipment for displaying slides, overhead transparencies, and chalkboard images in the remote classrooms. With each additional distance education element, we get further from the straightforward, conventional classroom learning event and enhance the learning opportunities for those at a distance. But the enhancements come at the expense of simplicity. As Peters (see Sewart, et al. 1983) has pointed out, comprehensive distance

education procedures can be construed as an "industrialized" approach to teaching and learning.

Rumble (1986), writing on the management of large distance education institutions, notes some of the differences from conventional education which instructional technologists will instantly appreciate. His main points include:

- Production of course materials requires detailed strategic planning and long lead times. A production management approach is required;

- Intensive and extensive staff time of academics, producers, and technicians working as teams is needed to produce integrated, publishable materials, contrasted with the work of a single academic in conventional education;

- Academic staff who produce materials are different individuals from those who will tutor students when the course is offered;

- Necessarily heavy reliance by academics on non-academic, technical and clerical staff for materials production and delivery to students can lead to occasional feelings of "loss of control" by academics;

- Budgeting, cost control, and personnel management require different procedures with a larger reliance on external contracting for services, complex delivery systems, and greater diversity of staff talent;

- Evaluation (formative and summative) and institutional research must be built into distance education systems because even simple mistakes can easily go undetected and become major problems.

OPTIONS FOR POLICY MAKERS AND ADMINISTRATORS

Throughout this survey, stress is placed on local adaptation of distance education principles to suit particular circumstances. For example, we are paying increasing attention to how distance education can assist K-12 education both directly with pupils and indirectly with teacher inservice training. We have a good feel for adults learning from distance education; experiments must be conducted to see what works under the very diverse conditions in American schools.

The essential message from past application of educational innovations is that policy makers and administrators must be informed and are aware of the implications of an innovation for their setting. Whether distance education experiments are conducted in senior citizens centers or elementary schools, the task is to come up with programs appropriate for the target audience, have favorable financial results, and improve learning.

When a difficult educational problem arises and a distance education solution is considered, the key questions for policy makers and administrators to ask of the instructional technologist are likely to include:

1. Pros and cons. Would a distance education approach solve the problem as well or better than conventional approaches? What are the advantages and disadvantages of each in our particular case?

2. Existing resources. Do we already have human and physical resources that could be used right away to initiate a distance education program? Is any training of present staff required to use these resources in a new way? What about longer term need for resources?

3. Pilot program. Should we develop a pilot program first to test the response and operation of a distance education approach? Or do we have to go all out in order for a fair test to be made? Is there past experience in the local area or region to provide some guidance?

4. Comparative costs. What are the overall comparative costs including new capital outlay for equipment, recurrent costs for materials, and any additional manpower? Can any components such as materials be purchased off-the-shelf or do we need to produce our own, possibly by contracting out for services?

5. Per capita costs. In our possible application of distance education, what is the estimated per capita cost for distance education vs. conventional education? Is that for each successful completion of the program?

6. Side effects. Are there educational side effects-- good and bad--which we should know about as the result of adopting a distance education approach to the problem? Will distance learners develop better independent study habits? Will they feel they have significantly missed the social/group reinforcement dimension of classroom learning? Is there a good balance of technology and human contact for the nature of the subject matter and the learners?

7. Other data. What other data are needed before we make a decision for full scale planning of a distance education program? What are the steps in doing a distance education needs analysis?

Given a reasonably organized program, people can learn at a distance using a variety of methods. But the right conditions must prevail for distance education programs to succeed. They need not be grandiose or employ elaborate technology, but the programs have to be carefully planned and receive strong commitment by policy makers for a fair test of their worth.

CHAPTER 2. A SELECTIVE HISTORY

Distance education is one of the most successful but unheralded educational approaches of the last 100 years. If there are any common themes, it has been diversity of forms and audiences plus evolving uses of technology as mentioned in the previous chapter. An historical perspective is needed to realize how this evolution has been achieved. This chapter highlights some of the United States' experiences from correspondence study to interactive video.

HISTORICAL ORIGINS OF THE TERM "DISTANCE EDUCATION"

The expression "distance education" was used in a 1903 magazine article. It reappeared in the early 1970s. By the 1980s, the term had become the generic name for education at a distance, including home study, correspondence education, open learning, telecourses, and teleconferencing.

Historically, the different forms of distance education are roughly characterized by the extent of educational media used. One branch (home study, correspondence education) originated with print-oriented correspondence courses. The second, later branch (open learning, telecourses, teleconferencing) grew from educational broadcasting, both radio and television, and audiovisual education of the 1950s.

By the 1980s, this print vs. media distinction had blurred significantly because of the proliferation of inexpensive, consumer-oriented communications media products. Many correspondence courses now use some form of non-print media (especially audiocassettes) while all telecourses use print materials often similar to those found in correspondence courses.

CORRESPONDENCE AND HOME STUDY

Before the mushrooming of television ownership in the 1950s, distance education was limited to print-oriented correspondence study using workbooks, study guides, and specially written texts. Students would mail assignments and receive written feedback

from the institution's instructors. Direct contact by telephone or face-to-face seminars with teacher and students was not only virtually unknown, but was, in all probability, not considered important by those offering correspondence courses.

Correspondence education (also called home study) developed in the mid-19th century to meet the growing demand for instruction. Print was the only communications technology available, and the expanding postal service became the delivery system, especially as railroads proliferated.

A short-lived but ambitious institution established in Ithaca, New York, in 1883 has lessons for today's distance educators. The Correspondence University offered a number of high quality correspondence courses developed by some 32 professors from Harvard, Johns Hopkins, and the University of Wisconsin. As reported by Harper's Weekly (MacKenzie and Christensen, 1971):

This scheme of education, or university, is designed to supplement that of other institutions of education, and not to rival or oppose them. It is specifically intended to assist the following classes of persons: those who are engaged in professional studies which can be taught by correspondence; graduates of colleges engaged in advanced studies; tutors and younger teachers in schools, academies and colleges; officers and men in the army and navy; young men and women employed in shops and upon farms who cannot leave their daily work to attend school or college; persons who propose to try the civil service examinations; and persons of any age and occupation who wish to pursue any particular study at home. (pp.39-40)

Although accurately targeting distance education's most receptive audiences, the experiment died an early death. The individual institutions failed to promote the courses and accept credits. The Correspondence University also was unable to obtain the critical respectability of New York State accreditation.

Despite early set-backs, major educational institutions such as the University of Chicago, land grant colleges, state departments of education, and private companies contributed to the still flourishing use of correspondence study. A few universities continue to serve upwards of 10,000 correspondence students annually by mail.

Some of the more sustained successful results have come from private companies, including the Hadley School for the Blind, started by a blind teacher in 1922. The leading American private institution is the International Correspondence Schools (ICS) of Scranton, Pennsylvania, established in 1891 because of a small town newspaper publisher's concern to educate mine safety inspectors. ICS today offers courses in business, technical, and self - improvement at diploma and certificate levels and has served more than ten million home study students worldwide.

The modern equivalent of the 1883 Correspondence University may be the Electronic University Networks which was started in San Francisco in 1983. EUN offers courses published on floppy disks for home computers through a network of over 30 colleges and universities. Electronic mail and on-line data search techniques augment the postal service and card catalog library searches in supporting computer-assisted instruction.

A major goal of many correspondence students is to earn college credit by passing CLEP examinations. Since the early 1970s, legal acceptance of course credit earned through correspondence methods is available. So for you patient folks who made inquiries after reading the Harper's article in 1883, thank you for waiting...

AUDIOVISUAL ADVANCES

During World War II, millions of American and British troops stationed around the world were introduced to both instructional films and correspondence courses. The Penn State instructional film research studies conducted during and after the war provided scholarly evidence of how instructional films should be produced and used for best effect.

From these studies and others, audiovisual professionals came to better understand that the interaction of media, print, and dialogue between teacher and students was a powerful means for optimum learning. This in turn laid the early conceptual foundations for distance education's media- oriented branch.

EDUCATIONAL TELEVISION'S 1950s AND 1960s EXPERIMENTS

The media-oriented branch of distance education had specific roots in the Ford Foundation's large scale instructional television demonstration projects. These classic experiments funded during the period from 1955 to 1966 included NBC's "Continental Classroom," CBS's "Sunrise Semester,"Penn State's use of closed circuit ITV, the Midwest Program on Airborne Television Instruction (MPATI), and Chicago TV College. Also started during this period was the Great Plains Instructional Television Library at Lincoln, Nebraska, which still provides national circulation of instructional materials on videotape and now videodisc.

These major experiments yielded hundreds of lessons. Researchers concluded there was no significant difference between learning by instructional television and conventional methods. Commercial networks and their affiliated stations learned that entertainment generated more revenue than instructional offerings. Educators learned that closed circuit television can teach wider audiences reasonably well.

TECHNOLOGY, DISTANCE EDUCATION, AND THE 1960s

The Sixties were a period of experimentation for instructional technology, much of it applicable to distance education for the 1970s and 1980s. Interest bounced from Programmed Instruction to Individualized Instruction to The Systems Approach to Education to Instructional Development.

DAVI conventions were packed with a cornucopia of new and irresistible technology. Audiocassette design was patented by Philips of Holland. Transportable Ampex videotape recorders and smaller cameras allowed classrooms to become television studios. Teaching machines gave way to computer terminals in remote locations.

Xerox introduced dry photocopiers for plain paper while microfiche became ERIC's standard method of making documents available to scholars. The various Bell divisions of AT&T were promoting "teleconferencing" using their new speaker phones with direct dialing of long distance calls to experts in exotic locations. The

postal service introduced five digit ZIP codes, a sobering reminder that that not all new technology improves performance.

INSTRUCTIONAL DEVELOPMENT

One special piece of technology--the Soviet Union's Sputnik satellite--inspired passage of the National Defense Education Act (NDEA): money was available for projects, summer and mid-career institutes, workshops, fellowships, and new departments in what was now being called "educational technology."

A major result of NDEA-supported activity was the integration of Mager's practical creativity with the methodical analysis of Bloom and Krathwohl (et al.), amply mixed with the vision of Finn (et al.) to produce "instructional development" for the improvement of teaching and learning. Writing specific objectives became methodical- -and often mandatory--in systematic instruction.

This multi-disciplinary, multi-faceted curriculum and course planning and design process influenced distance education in the 1970s in the form of new approaches to telecourse production and student support services. The film/television process reinforces a multi-disciplinary approach. Technicians, writers, producers, editors, and directors all contribute to how the final result appears.

EDUCATIONAL TELEVISION: CPB AND PBS FROM 1967 ONWARDS

Creation of the Corporation for Public Broadcasting (CPB) in 1967 led to a national non-commercial television and radio system through the Public Broadcasting Service (PBS) and National Public Radio (NPR).

While more funding was available as a carrot for the rapidly expanding number of public broadcast stations, there was also the inevitable stick: the various federal funds for equipment, program leasing and production, and recurrent costs had to be matched with state and local funds. Station managers began to distinguish between the small audiences watching locally-made instructional programs and larger, potentially generous audiences which would support newly available daytime programs such as "Sesame Street," "Electric Company," and "The French Chef."

Distance educators from colleges and schools who had relied upon their local educational stations for airing instructional programming even during prime time in the 1960s were now left with, perhaps, an hour at 6:30 a.m. on Saturdays and Sundays. Educational television in many places had been replaced by "public television" and it took distance educators some time to fully appreciate this distinction.

The unfortunate demise of the National Association of Educational Broadcasters (NAEB) in the late 1970s created a communication gap between educators and broadcasters. The NAEB meetings and publications had provided the principal forum for distance educators and broadcasters to exchange views, new ideas, research results, and informal opinions about the state of educational television and radio.

NEW, IMPROVED TELECOURSES

Three factors came together in the early 1970s to significantly change the planning, content, and appearance of telecourses.

- Television production standards rapidly improved with emphasis on color videotaping and location filming/taping;
- The costs of these changes were prohibitive for a single distance education program to bear by itself: inter-institutional cooperation was one way of easing the financial load through cost-sharing;
- Multi-disciplinary planning and production were intellectually supported by the new instructional development process which also readily translated into multi-institutional planning.

The contrast in appearance between the old and new styles of telecourse production was striking. The basic black and white telecourses of the 1950s and 1960s were usually the work of a single faculty member given released time to prepare a study guide and adapt existing classroom lectures into 30 live television programs of 30 or 45 minutes each. A producer and sometimes a graphic artist assisted and encouraged the teacher who had probably never been on television before.

In the early 70s, several institutions started producing telecourses using instructional design strategies. Miami- Dade Community College's "Man and Environment" was first aired in 1974. This was followed closely in 1975 by "As Man Behaves", an introductory psychology series, from Coastline Community College in Orange County, California. Both telecourses used color and their high production values which helped market them nationwide.

A third type of telecourse, the "wrap around", was also developing. An existing television series with strong educational content was given a textbook, study guide, teacher's guide with sample assignment and examination questions, and an institutional guide to running telecourses: a total course package.

The first such nationally used wrap around telecourse was "Ascent of Man". Jacob Bronowski had traveled the world with a BBC production crew to produce thirteen, 50 minute visually and academically stimulating programs. Prior to its prime time PBS airing in 1975, teams from San Diego State University and Miami-Dade Community College prepared a package of instructional materials for credit students. Strong publicity, novelty, and the high quality of the production persuaded some 420 institutions and 40,000 credit students to participate in the experiment.

Since "Ascent's" success, a number of wrap around telecourses have been produced. But Zigerell (1983) cautions that this post hoc approach can be educationally inferior to the purposefully designed and produced telecourse. The latter starts from an identified curriculum need and is planned using instructional design methods to integrate all components into a unified, academically sound learning package. A major weakness of some wrap around telecourses has been insufficient time to develop the necessary supporting materials.

GREATER UNDERSTANDING OF DISTANCE EDUCATION: THE 1980s

Any history of the 1980s will likely include the success of consortia for the cooperative production of telecourses, the great increase in distance education institutions around the world, the application of the home microcomputer and videocassette recorders in distance education, and the exploration of the interactive videodisc.

It will also be known as a time when the traditional audiences for distance education were changing. Attempts are underway to reach school-age populations as well as those adults outside society's mainstream. New audiences require new thinking. Computer networking and telecommunication satellites are now available while desktop publishing is cutting the costs of producing the traditional printed materials of distance education.

On the other hand, the sobering failure of the University of Mid-America must be carefully analyzed for inter-institutional cooperation gone bad and other issues. We can hope that instructional technologists will be mindful of past successes and failures as they play key roles in the new applications of distance education to tough educational problems.

CHAPTER 3. THE BUILDING BLOCKS: COMPONENTS OF DISTANCE EDUCATION SYSTEMS

One interpretation of the history of distance education is that there are common elements in all distance education programs; the differences are how those elements are put together. While we strive to apply systematic thought and research to distance education, there are still strong elements of the art and craft of teaching.

The art in distance education lies in applying instructional technology, educational organization, management, and learning theories in such a way that students don't notice any of this heavy educational paraphernalia. Distant learners usually can choose the "when and where" of their learning while finding diversity in the learning process itself--if distance education programs have planned for different learning styles.

Beyond television programs, audiocassettes, and textbooks are educational kits for the sciences, optional seminars with a tutor, telephone and/or office hours for direct tutor interaction, peer study groups, brief residential periods, computer-assisted learning, and field trips providing the distance learner with many paths to learning.

The purpose of this chapter is to briefly describe the major building blocks of distance education systems which are the organizational and managerial elements ensuring that learning takes place.

POLICY AND FINANCIAL PLANNING

1. Policy, curriculum, and course analysis. Each institution must carefully decide how its use of distance education will fit with its goals in terms of overall policy, legal status, and accreditation. A needs analysis must be performed to explore the full range of distance education offerings: programs, curricula, courses. A market study of potential students by demographic profile and expected numbers is critical for decision making.

The questions abound: What union considerations are there if we offer a distance education course for the high school's advanced science students? Will a community college's extensive distance education program offered to inmates in a prison located in another community college district be eligible for state aid? Will a completely "packaged" curriculum in medical records technology be acceptable for professional certification in local hospitals? What supplementary activities are necessary to use an otherwise highly acceptable course?

These are the types of issues which must be addressed before entering into any further consideration of distance education activities.

2. Financial estimates and planning. Directly related to policy and curriculum considerations are the financial issues of distance education programs.

For example, many institutions that first offered "Ascent of Man" as an elective course in their humanities departments found out that enrollments were slim. Some concluded from this that telecourse enrollment generally was too low for them to meet the costs involved. But institutions that offered the course as a core course were rewarded with good registration and earned a comfortable surplus over expenses.

Few institutions can afford to produce their own telecourses at a standard considered appropriate for today's students. But they can join consortia which allow for the pooling of production costs in return for use of the course, as is done by state departments of education for production of school- oriented materials through the Agency for Instructional Technology.

While it seems that distance education often requires large course registration numbers to make it cost effective, this is not always the case. A distance education course may be used by four or five students needing it for late-summer graduation. These low numbers would not justify offering it in conventional classroom fashion--or be possible at all if the professor is in Turkey for the summer.

Distance educators have found that decision making which juggles such key factors as cost analysis, expected enrollments, and consortium membership is greatly assisted with microcomputer spreadsheet and project management programs (Lotus 1-2-3, Supercalc, Quattro, Multiplan). While setting up the parameters is time consuming, the process itself helps focus on all of the variables inherent in distance education planning.

INSTRUCTIONAL DEVELOPMENT AND DESIGN

A committee or course development team is assembled to specify goals, objectives and content, and to translate that content into a coherent course. How that team is led and how it functions are critical to the success of the instructional development outcome. The most distinguished professor, creative producer, or brilliant graphic artist contributes little if he or she cannot work with others. Often, the instructional technologist plays a coordinating role--sensitive to human whims as well as the demands of timetable and budget.

1. Course content planning and specification. Course content must meet the academic needs of students taking a distance education course in any institution. This is true even where the distance education program consists of one person assigned quarter time to administer a single, already packaged, telecourse.

In the case of adopting an existing course, the distance educator must be satisfied that the minimum content requirements of his or her institution, and of the department giving credit, have been met. If there is disagreement on this later, it is likely the students who will suffer.

For distance education programs active in course production consortia, content specialists from your institution must be involved in the planning of any consortium-produced courses. Specialists may serve on content planning committees or as critical readers of the content outline and subsequent media scripts, texts, study guides, examination item banks, etc. The issue at stake is well known by instructional technologists: the "Not-Invented-Here Syndrome" which states that anything we haven't created is automatically inferior to those things we have created.

Specifications developed by a course team go to media producers who are not likely to be familiar with the content. In this critical transition, the instructional technologist often plays a bridging role, ensuring that academic standards are maintained, creative solutions to content presentation are encouraged, and the interests of distance learners are not lost in the pressures of meeting deadlines and being cost-effective.

2. Production and formative evaluation of materials (print and non-print media). The learning materials--audiocassette, broadcast television program, study guide--used in distance education are roughly equivalent to the teacher's lecture in the classroom. But distance education's open door means that the materials can be scrutinized by anyone, are often used over a period of years, and are costly to produce.

Production of learning materials consumes the most time and money in creation of telecourses intended for national distribution. Great care is required to produce 30 half-hour television programs with accompanying printed materials to be used by thousands of students over a minimum of five years.

In the late 1960s, the term "formative evaluation" came to indicate, among other meanings, the process of evaluation and corrective feedback during the creation of educational materials. Even modest, locally produced efforts require formative evaluation to eliminate errors, identify ambiguity, and maximize learning. Formative evaluation can range from script and storyboard reviews by outside consultants through to the testing of a pilot program using students who would typically take the course.

3. Planning feedback and interaction, assessment, and course evaluation. The instructional development team also plans the other elements of a distance education course package. Student interaction with a content specialist or tutor may take the form of telephone hours and visits to learning centers. Diverse feedback activities are planned which advance students' learning such as weekly computer-based individualized assignments, projects, and term papers.

Decisions are also made on secondary learning activities (lab kits, intensive residential seminar, ensuring access to library materials, etc.). Instruments for measuring student progress and achievement are specified as well as course evaluation by the students and possibly by an outside evaluator.

When a course package produced elsewhere is used, the main task in adapting the package to suit the institution's own specifications and requirements. In many cases, a single content specialist working with an instructional technologist can readily adapt the package to suit local conditions.

STUDENT SUPPORT SERVICES

Admiring the motivation of most distant learners, one observer noted that they would probably learn under water if that was required by the course designers. Under those circumstances, the role of student support services is to provide the oxygen necessary for the learners to complete the course and take the examination.

1. Publicity and information. Marketing distance education is a necessity. This component has two parts: publicity and follow-up information.

Publicity takes many forms: press releases to the news media, advertisements in strategic places at the right times, arranging interviews with successful students, and direct mail to target audiences. Bulletin board posters for libraries and public notice boards can include post cards to be returned for further information.

In the USA conventional students enroll heavily in distance education courses. Information on distance education courses should be provided to advisors and counselors. Personnel directors of private and public enterprises should also receive information about specific courses of direct interest to their employees.

Publicity is necessary, but not enough to boost enrollment. For example, an answering machine can take inquiries after hours and on weekends. Follow-up information is needed to explain distance education, encourage academic counseling, and generally set a tone of support and assistance to those who are seeking educational alternatives.

For school districts, providing information about distance education to school board members, parents, and voters is highly desirable. The object of such information is to avoid misunderstanding and controversy about an educational method not generally understood by the public.

2. Registration, records, and administrative needs. Registration and record keeping must be efficient and reliable. A computer system used by trained staff is a must for any distance education system in the 1980s. Even small distance education offerings have to have a way of keeping track of registration data, mailings, and fees.

The amount of information which is required for each student's record can be enormous. This is especially the case where students can enroll at any time, drop out for a period of time and return later on. Records are kept on academic performance, counseling, fees, and demographic profiles for use in institutional research.

The system designed to handle this data base must meet the academic needs of the students, teachers/tutors, and counsellors plus the administrative needs of the institution. Whether this can be done effectively using the central computer of a larger, conventional institution requires a thorough analysis. Relatively inexpensive but powerful minicomputers or super microcomputers are now available. Separate systems may have definite cost-benefit features.

3. Delivery system for materials and media. The production of high quality printed materials and creative media programs is an exercise in futility--unless there are effective means of ensuring that students receive them at the right time. The term "delivery system" suggests the good old days when milk was delivered to the doorstep in the early morning. The system was dependable and automatic, but also flexible if a note were left in an empty bottle the night before. Perhaps the success of the British Open University is reflected in the fact that Great Britain still has home delivery of milk!

For telecourses (including radio), the delivery system must provide for scheduled distribution of programs over broadcast or cable

channels, closed circuit or ITFS, and/or videocassettes. For all those channels except videocassette, this means supplying high quality tapes to a control room in time for logging in and labeling by technical staff.

Where libraries/LRCs provide audiotape listening or videotape viewing, enough good quality tapes must be duplicated to reflect enrollment figures and the number of listening and viewing stations or checkout policy. Printed materials and educational kits must either be available at book stores and libraries/LRCs, or sent to students for use at the right time.

New delivery methods are a mark of the 1980s. Slow scan TV, teleconferencing, electronic mail, computer-assisted instruction, and interactive videodiscs are not used regularly or occasionally by distance education programs. Use of videotex (data base information accessed via ordinary telephone on an adapted television set) is common in Europe. Interactive cable television has been tested but not adopted in the USA, though experiments in one decade seem to portend acceptance in the next decade.

4. Learning support, feedback, and interaction. A two-way flow of communication with students helps overcome problems with content, provides encouragement, and in a small way substitutes for the loss of social contacts which conventional education provides. Often only a minority of students take advantage of such a provision, but there is nearly universal agreement that some means of interaction--especially the telephone--should be available.

Interaction ranges from writing comments and suggestions on homework returned from the tutor to organizing face-to-face seminars or individual meetings. Telephone office hours are common, allowing live interaction which still retains the flexibility of learning at a distance so important to many distant learners.

With the proliferation of home computers, electronic mail and ... quicker turnaround time of messages than the postal system. Electronic bulletin boards can provide a lively, informal way for a number of students and their instructors to take part in screen dialogues. However, we're not yet aware of distance educators

using the notorious "976" prefix for group telephone seminars.

5. Student assessment and examinations. Students like to know where they stand in a course while institutions are concerned with maintaining academic standards. Similarly, distance educators are anxious to show that their courses operate at the same or better standard as those in conventional education. In our desire for quality control, both administrators and students are pretty much agreed that student assessment is desirable.

Most often used are objective assessment methods which can be computer marked and which do not require extensive involvement of content specialists following setting of the questions and specification of answers. Problem-solving sets, essays, and projects are also assessed, especially in advanced courses where numbers are in the hundreds rather than thousands.

6. Learning and career counseling. Students drop out of all distance learning systems and methods at a rate equal to or greater than those in conventional education systems. The reasons are numerous and reflect on personal issues which students face as well as flaws in a given distance education system. This makes counseling for problems associated with learning, as well as career counseling, important services in a distance education program.

Dropping out can be deterred by a well run orientation for new distance education students. They need to know that distance education can be lonely education, but that it is possible to reduce that sense of isolation by using methods built into the system such as the phone hours and counseling. Individual learning puts more burden upon students to identify and overcome their own academic shortcomings.

Keeping up with current trends, some institutions encourage distance education study groups--a type of support group that provides some of the socializing and academic interaction lacking in programs with individually- oriented distance education services.

Career counseling should be available since so many distance education students are mature adults trying to improve their

existing careers or prepare for a new career. Such counseling can also assist the student in developing realistic career goals and specify how to meet those goals through distance or other, more traditional, education.

7. System evaluation and research. Distance education systems are fragile. They are vulnerable to a host of seemingly harmless mistakes which can eventually prove fatal. Frequent evaluation of all of the components is necessary and should be a part of even the most modest efforts at distance education.

Evaluation should ideally be performed by someone who is not involved with producing materials, administering support services, or assessing students. A sympathetic outsider coming in periodically to give the system a once over is one way of measuring the health of the system.

Another method is to assign a staff member who gets along well with other staff to evaluate the system and to conduct research on key aspects of distance education itself. Particularly important is tracking student achievement course by course, the demographics of each course, and trying to identify where the system may be weak in its services offered to students.

CHAPTER 4. ORGANIZING FOR DISTANCE EDUCATION

Programs must operate within a larger organizational structure receptive to alternatives to classroom-based education. While there is great diversity in distance education programs--reflecting social and educational traditions, only a handful of organizational models have emerged as structures to house distance education services.

These programs range from modest coordinating offices of one person to self-standing universities with payrolls in the thousands. While this chapter outlines several general organizational options found in distance education, clearly each program must fashion its own organizational framework to suit the services provided its distance learners.

ORGANIZATIONAL OPTIONS

The basic options for organizing distance education services have not changed much since correspondence and home study techniques were created in the 19th century: 1. Self-standing institution; 2. Department/college within a conventional institutions; 3. Distance education coordinating office within a conventional institution; 4. Consortium providing distance education for member institutions.

1. Self-standing institution. The USA's decentralized education system of state, local, and private institutions has provided a wide choice of conventional educational opportunities. This array of choices undercuts the market for distance education degree-granting universities found elsewhere. On the other hand, private correspondence-oriented companies such as the International Correspondence Schools offering certificate and diploma instruction in business, technical, and high school subjects have survived by carving out a special market niche.

Government-supported distance education institutions have flourished outside the USA in places where limited educational opportunities and centralized support of education are common.

Under such circumstances, about 30 major self-standing institutions have grown up over the past two decades.

For example, the Indonesian Open University (Universitas Terbuka or UT) offers higher education to those denied conventional higher education by age restrictions, entrance examination cutoffs, and remote location. The central government can economically and politically justify subsidizing the UT because it serves 40,000 students spread over the nation's 7,000 inhabited islands spanning some 2,100 miles.

The independent distance education institution is a "full service" facility, handling all aspects of education from curriculum and course development to career counseling and job placement. While services such as media production, printing, tutors, and examination marking may be contracted out, the student deals only with the autonomous institution.

2. Department/college/institute within a conventional institution. The most common organizational setting for distance education in the USA is virtually unchanged since William Rainey Harper established the Extension Department at the University of Chicago at the turn of the century: a separate administrative unit to deal with distance education students within a conventional institution. These are sometimes called "dual-mode" institutions. While the University of Chicago dropped their extension unit in the 1960s, the Chicago City Colleges (the city's community college system) created the Chicago City Wide College in the mid-1970s to incorporate Chicago TV College and other distance and extension education programs in one of the nation's largest such units, including its own UHF television station.

The advantages of offering distance education courses within an existing institution are compelling: credentials are readily accepted, various administrative and student support services already exist, curricula are established, academic and technical services abound, and students can mix distance education with conventional education credits to build a degree.

Depending on institutional policy, it is possible for the distance

education unit (especially if designated a "college") to exhibit virtually all of the characteristics of a self-standing distance education institution. Curricula and courses can be created specifically for distant learners, registration can be conducted by mail or telephone, and a delivery system and student support services can be developed.

The increased costs of operating a separate department or college can be defended if the cost per distance education student is lower than for a campus-based student. In the case of the University of Wisconsin, correspondence courses are sent all around the nation and overseas giving a global basis for enrollment rather than limiting the student body to those able to attend classes in Wisconsin.

Such distance education units will typically use services already found within the larger institution. Distance education, supported by existing services, can be a cost-effective way of raising FTEs without a direct, linear increase in overhead expenses.

On the other hand, a distance education unit within a conventional institution often faces the daunting task of gaining approval for new courses, curricula, and teaching methods from conservative faculty groups of the larger institution. Also, the claim that distant students are treated with less consideration than on-campus students is, unfortunately, not uncommon. But this does not have to happen.

For example, central administrative staff members may refuse to discuss questions related to a student's record over the telephone because of the privacy policy of the larger institution. The fact that the student lives 300 miles away and can't just stop by after class is considered irrelevant. A simple policy change combined with a Personal Identification Number (PIN) would overcome this stumbling block to better service for distance learners.
To achieve success with this organizational model, the distance education program has to establish its optimum modus operandi within the larger institutional framework. A great deal of management's effort must go to communicating and demonstrating the distance education advantages for the wider institution.

3. Distance education coordinating office within a conventional institution. This is a more modest version of option no.2 and is found where the conventional institution has multiple campuses, or is not deeply involved with distance education. The coordinating office is often placed in the neutral territory of the central administration, either as a separate office or sometimes as part of a learning resources center. Schools districts typically use this model to serve their students, teachers, and administrative staff as do some multi-campus community colleges (such as the Dallas system).

The role of the coordinating office is to arrange for suitable courses to be offered, establish distance education coordinators within each campus or department offering courses, and publicize distance education offerings. Students enroll either by mail through the coordinating office or directly at a campus of their choice. Student services such as tutoring and examinations are typically handled at a local campus by the department giving credit.

There are distinct financial advantages to this organizational model since it allows a distance education program to be organized with little, if any, increase in staff. If an institution wants to experiment with telecourses, provide a few courses to gifted high school students on a trial basis, or offer a high school equivalency preparation course using videocassettes, this is the simplest way to begin.

The modest coordinating office is also a way of allaying fears of branch campus presidents that telecourses would take students away from them. In fact, the work of the distance education coordinating office can often enhance campus enrollment.

The distance education student may be put at a disadvantage if the local campus has a weak or disinterested distance education coordinator. In such cases, unless the coordinating office can diplomatically intervene, there is no one to turn to for the support and assistance so vital to the student and the overall health of the distance education program.

4. Consortium providing distance education for member institutions. This is a hybrid model with elements drawn from each of the previous three models. It is:

   a. a self-standing institution funded by members,

   b. drawing upon the strengths and resources of the consortium members, and

   c. providing the coordination which allows each member institution to enroll students without having to develop a full-scale distance education program of its own.

The consortium office, in effect, serves as a distance education resource center to actively develop curricula, produce or acquire courses, and provide--or coordinate-- services which fit the member institutions' interests. Unlike the more limited production consortia which have proven so successful in producing quality course packages (e.g. the Instructional Telecommunications Consortium and the Agency for Instructional Technology), the distance education consortium helps members organize vital student support services as well as administrative services.

Although educational systems in the USA are quite experienced in the concepts and operations of consortia, this model has found little success in distance education, despite various attempts and the generous support of funding agencies. The University of Mid-America was a consortium of 11 midwestern universities but failed to live up to expectations despite millions of dollars available through federal and state funds over a ten year period.

One interesting outgrowth of the collaboration of university colleges of engineering and private industry (described in Chapter 7) is the National Technological University (NTU) of the Association for Media-Based Continuing Education for Engineers (AMCEE). This consortium coordinates technical continuing education and advanced degree studies for some 24 universities together with a number of large and small companies. While degrees are conferred by individual institutions, the courses can be shared via tape, ITFS transmissions, and satellite by participating members. The NTU has the advantage of being focused within a profession which historically has had uniform standards of performance.

Existing consortia such as statewide or regional educational television networks and cooperative educational service agencies such as the BOCES (Board of Cooperative Educational Services) in New York state can often add a new service provided the constituents both feel a need to offer distance education and are willing to provide human and financial resources to prove their commitment.

Stumbling blocks to successful consortium organization appear in the stages beyond production of course packages and their distribution. Although the consortium office might be quite well organized and disciplined, participating institutions may not provide the careful advance planning and management of distance education so vital to success.

Institutions may be participating only because a senior administrator didn't want his/her institution left out. This lack of commitment trickles down to those who must implement the consortium's agenda in a member institution.

However, experience shows that rejection of an innovation such as the distance education consortium may be a direct result of poor timing rather than an inherent problem with the idea. Changes in leadership, improved financial situations, and advances in technology can lead to eventual success following reintroduction of an old idea in a new, improved version.

CHAPTER 5. INSTRUCTIONAL TECHNOLOGISTS AND STAFFING FOR DISTANCE EDUCATION

Whatever the organizational model that a distance education program fits into, ultimately the critical factor for success or failure rests with the quality of the staff members who plan, create, and manage the program.

These programs require staff members who understand the nature of education at a distance. One role for instructional technologists is to help staff members and specialists appreciate how distance education is different from other forms of education and media.

For example, media producers must recognize that they are crafting program series whose content will appear in examination questions; not making 30 second commercials for a Clio or Addy Award. Administrators work together with researchers and counsellors on specific methods of reducing dropouts--an issue rarely confronted in classroom-based higher education. Clerical staff know that a careless breach of an examination's security disrupts thousands of students' work and family life when they have to retake it later.

In the remainder of this chapter, staff categories are discussed from the perspective of the instructional technologist and how he or she can enhance the operations of a distance education program by using detailed knowledge of distance education and all of its components.

INSTRUCTIONAL TECHNOLOGISTS AND DISTANCE EDUCATION

Distance education programs in the USA were slow to embrace instructional technologists--and vice-versa. Perhaps because of the correspondence, broadcasting, and adult education origins of many distance education programs, instructional technologists were not often recruited for them until instructional design was adopted in the early 1970s.

British Open University and Coastline Community College started

using a wide array of specialists in evaluation, assessment, research, graphic design, instructional television, and computers. As the only professionals with some knowledge in all of these areas, instructional technologists began to serve as coordinators of the specialist teams. .

Shortly after the BOU started using instructional design strategies for its course development, it established the Educational Technology Institute in 1973. With some 80 staff members, the Institute has been setting high standards for instructional technologists working in distance education ever since.

Each distance education unit requires typical instructional technology tasks such as writing objectives, integrating learning strategies with media, and conducting formative evaluation of learning materials. A role not often written into job descriptions of instructional technologists is acting as a surrogate for the distant learners.

The instructional technologist can serve as "house gadfly," asking for clarification of content by example, suggesting four more seconds for a camera to linger on a visual, and matching a tutor's phone hours with the available times of working students. This student perspective is often sharpened as the instructional technologist conducts formative and summative evaluations, analyzes course evaluations, and develops demographic profiles.

The result is a form of quality control for the unit's materials and operations, and beyond that a way of humanizing and softening what can be a rigid mechanical process.

ACADEMIC, INSTRUCTIONAL DEVELOPMENT, AND PRODUCTION STAFF

Producing mediated course materials or adapting existing courses for local needs requires a multi-disciplinary team. Specialists in content, instructional development, and production collaborate to produce materials that can stand public scrutiny and repeated use over a five year lifetime.

Academic and content specialists. In creating curricula, syllabi, and course materials, specialists in subject matter provide the

academic foundations from which all else is derived. If subject specialists working on an organic chemistry curriculum require hands-on laboratory experience, this must be included in the overall course design.

While creating new courses is more interesting, content specialists often are asked to review existing distance education courses produced elsewhere. A danger is that the "not-invented-here" syndrome will prevail: outside courses will be declared "unsuitable for local consumption". But unlike the textbook market, a varied selection of distance education courses is rare.

As a review team member, the instructional technologist can diplomatically suggest changes to make a proposed course acceptable. Perhaps adding several locally made programs, modifying assignments, and substituting a study guide chapter would save the unit from developing its own course from scratch.

Where a distance education unit is part of a larger production consortium, it is essential that academics from the participating institutions agree, and sign off, on the successive stages of production. When the completed materials appear at the local institutions, there should not be any surprises.

As mentioned before, instructional technologists often play a major coordinating role in course production efforts. They make sure that content specifications, scripting and storyboarding, and final production operations are kept smooth and on schedule. They strive to develop harmony between wary academics, perfectionist producers, and deadline-obsessed administrators. This difficult objective requires patience, a grasp of the content, and appreciation of quality but cost-effective education.

Instructional developers. In small distance education units, it is simply a matter of changing mental hats when an instructional developer working on specific tasks is also the instructional technologist dealing with overall issues of planning, production, and student services.

But there can be conflicts between the two roles when the same person wears both hats. Materials developed as an instructional developer may show defects in a pilot test. Strong professional standards are

required to respect the data, admit the defects, and make changes. The role conflicts get even more muddled when the instructional developer also works as a media producer while still serving as overall instructional technologist. Memories of Abbot and Costello come back when we ask, "Who is coordinating whom?" It is stretching both creativity and objectivity for an instructional technologist to have to perform three roles at one time--unless formative evaluation methods are conscientiously used to provide corrective feedback.

One solution is to contract for media production services. This provides the necessary distance between those who create and those who must assure the quality of the products.

Courseware production staff. The number of people required to produce a nationally distributed telecourse really balloons when we consider all of the production technicians. For our purposes here, we will take the telecine operator, floor manager, camera operators, and others as part of the whole studio package. The same applies to the print production unit with its compositors, plate makers, and press operators. Four media production professionals concern us in this quick overview because even modest production units find them indispensable: instructional television producers, graphic artists, computer software writers, and reprographics specialists.

Most such creative people would prefer to be competing for Emmys, Oscars, Peabodys, Pulitzers, and Caldicotts rather than toiling on behalf of distant learners. Keeping this narrow audience in perspective is not easy; maybe that's why the instructional technologist is the one to keep nagging them about their real audience.

Where telecourses or other media-enhanced courses are created, the media producer is the key person in converting the script into a product which both teaches and holds the learner's attention. The graphic artists of academia have the unenvied task of taking the opaque verbiage of content specialists and the often jargon-filled instructions of the instructional developer and making accurate, neat, and attractive visuals.

Software writers working in distance education find themselves at the cutting edge of education's application of computers. Writing

for interactive videodisc applications is already happening and will increase when later generation, consumer-oriented hardware becomes available. The reprographics specialist has the difficult job of helping content specialists and instructional developers convert masses of written words into attractive published materials and whose layout and design enhance the understanding and learning of a course's concepts.

Who's in charge? Depending upon experience and the relationship with colleagues, the instructional technologist is often selected as the coordinator of the course development team. This role comes from familiarity with and interest in various production technologies, as well as a managerial position within the organizational structure.

The most demanding task in this coordination role is to keep all of the specialists in reasonable harmony. Cooling inflamed egos and keeping the focus on how best to serve the distant learner is not an easy task. It is a role instructional technologists are rarely trained for.

STUDENT SUPPORT SERVICES STAFF

Student support includes all of the contacts which students have with distance education courses: initial information, course registration, tutoring (face-to-face, telephone), residential or classroom portions of a course, support to auxiliary learning centers, support to tutors, administration of examinations, record keeping (transcripts), and various forms of counseling.

In some distance education units, the delivery system for getting materials to students and videotapes to broadcasters is part of the student support group; in others, delivery is a separate section. For simplicity and since this is common practice in the modest programs found in the USA, we will consolidate the two operations.

The instructional technologist must deal with all of the above, but is particularly involved with tutoring and student assessment as a part of the overall course design. Similarly, any patterns of learning difficulties which the counsellor might discover need to be followed up by the instructional technologist for later course planning. Difficulties with the delivery system--especially as it

relates to use of media--fit into the same "need to know" categor . The instructional technologist as sketched here may seem like a character out of Charlie Chaplin's film, "Modern Times", with wrench in hand madly running around keeping the distance education machinery running amid the ongoing ef -ts of fellow workers. More accurately, the instructional technologist in a given setting is likely to provide whatever assistance he or she is comfortable with and which is acceptab . to fellow staff members.

CHAPTER 6. THE ECONOMICS OF DISTANCE EDUCATION

For administrators and policy makers considering distance education, a major question is how much will distance education cost--especially compared with conventional education? This chapter examines some of the economic and financial aspects of distance education by analyzing the following statements:

1. The startup costs can be high--in effect paying for the bulk of five years worth of teaching in advance;

2. When courses are poorly prepared or offered too frequently, initial high enrollment can drop during the course and subsequent enrollments may be low;

3. The cost per student can be favorable in distance education when enrollments are high, the course is used over several semesters, or where low enrollments cannot support a conventionally taught course at individual institutions but combined totals justify distance education;

4. Membership in a production consortium may provide quality materials more cheaply than local materials production;

5. Distance education methods often allow using existing resources in novel ways;

6. Costs for distance education may be reduced by contracting for services rather than employing permanent staff.

STARTUP COSTS

To use a consumer analogy, conventional education is financed by "instalment" buying while distance education is partly bought on the "layaway plan." The layaway plan is not popular with policy makers and administrators. Paying the startup costs of experts, materials, and equipment in advance of enrollment revenues can be unsettling to officials used to writing checks for salaries and overhead costs while students are occupying seats in classrooms.

An economic characteristic of distance education is that the cost of producing the instructional materials is considered a capital outlay, typically depreciated over five years. On the other hand, classroom-based instruction and the student services plus delivery system portion of distance education are ongoing recurrent expenditures.

For those distance education programs not producing their own materials, the cost of leasing or licensing materials is often determined by a formula based on course enrollment and paid as a lump sum to a consortium, private company, or another institution. Sometimes a one-time payment for unlimited use for N years is negotiated for video tapes and computer programs. The complications of leasing, licensing, lease-purchase, and outright purchase with unlimited licensing are a lawyer's delight. For institutions just starting this process, caveat emptor.

Five levels of startup complexity can be identified reflecting varying startup costs. In a rough hierarchy of least to most expensive, these levels are:

1. Correspondence courses: print only;
2. Remote classrooms using teleconferencing links;
3. Telecourses: leased/adapted;
4. Correspondence courses using media/computers;
5. Telecourses: locally produced.

Of course within each level, costs can range widely depending upon elaborateness of the effort. For example, the printed materials in Level 2 may be simply a set of stapled mimeographed pages typed by the content writer and run off by a clerk. Or the same content may be printed on glossy paper with mechanically stitched binding containing full color illustrations which required a staff of five to produce and costs twice as much to mail because of the heavier paper.

Correspondence: print only. Printed materials in the form of specially written text books, or more often study guides and other printed materials to accompany existing text books, require the work of one or more writers teamed with an editor and a layout/graphic artist. Word processing and desktop publishing techniques are streamlining the process, increasing productivity,

and reducing preparation costs. In some institutions, this means hiring only writers with word processing skills to eliminate the intermediate stage of entering draft versions into the computer by a typist. The startup costs are limited to the costs of the content specialist, plus illustrations, editing, and printing.

Remote classrooms. While not the individualized study most associated with distance education, the remote classroom learning environment nevertheless provides a valuable and inexpensive method for providing education at a distance. It can mean simply linking one or more remote classrooms with an existing classroom --or instructor's home or office--using two way audio communication by ordinary telephone lines. The startup costs are limited to the telephone installation (if required) and speaker phones (ordinary or special purpose for teleconferencing). Connect time is then the recurrent cost above ordinary classroom costs. Used in this way, this level of complexity is cheaper than correspondence, print only. Additional equipment such as a facsimile machine and slow scan television can provide graphics over a second phone line. For these enhancements, it is possible to pay as much as $25,000 per site.

A more elaborate system using a form of closed circuit television and audio links can be developed as is typical with many school systems using ITFS low power, line of sight microwave links. In the latter case, equipment and advanced planning would indeed make this level quite complex and expensive--about $6,000 and up per site plus the main system. Where major national or international teleconferences using satellite television technology are used, the startup costs depend on existing facilities.

Telecourses: leased/adapted. Where an institution takes a totally packaged leased course without alteration or additional materials, the startup costs are minimal. However, most institutions will want to adapt a course to fit their own curriculum and requirements. This often involves work similar to that needed for print-only correspondence materials. Creation of examinations and assignments plus any television programs designed to complement the leased programs will of course cost extra. While institutions may be reluctant to pay for such costs, adaptations may reduce dropouts and increase the feeling of loyalty to the institution--indirect benefits which may be worth the extra effort and cost.

Correspondence courses using media/computers. Media-enhanced correspondence courses typically use a series of audiocassettes in the form of lectures, interviews, and documentary-type programs to accompany a text and study guide. While much cheaper and easier to produce than videocassettes, they still require advance planning and quality recording conditions. Where distance education programs use computer assisted instructional methods in addition to correspondence, either existing computer programs must be integrated into the course work through a licensing agreement or programming must be specially written with distance education students in mind.

The costs of any media used to enhance correspondence instruction may be offset by additional fees, recycling the materials for reuse, or use at an LRC where they are available for conventional learners as well as distant learners.

Media enhancement can also mean the use of various specially designed educational kits which have, for example, chemistry, physics, electronics, and biological experiments designed for home use. Startup costs on creating such kits are obviously quite high, but this is one means of providing students with the chance to do "hands on" work short of attending laboratory workshops or short residential courses.

Telecourses: locally produced. It can be readily inferred from previous chapters that startup costs for telecourse productions are high--$175,000 to $600,000 for the standard 30 program series with accompanying printed materials--and may only be recouped over a period of years. This means that the locally produced telecourse is likely to include only basic production values unless wider distribution through a consortium or other marketing device is possible.

We can now buy sophisticated, affordable consumer hardware such as VCRs. Parallel progress has also occurred in cheaper but better production equipment. But production costs are still higher than the advances in technology would suggest. One explanation is that distance educators now demand higher quality--replicating commercial television standards. The best we can expect from better production technology is to hold those costs steady while improving learning through better design and student services.

HIGH INITIAL ENROLLMENTS

There is a delicate balance between spending X dollars to offer one or two courses with high production values and offering four or five more modestly produced courses for the same money. Attractively produced courses which fit students' basic course requirements can attract large enrollments which may offset the higher costs of production or leasing. But if the glossier courses are offered too often because of lack of funds for producing/leasing other courses, subsequent enrollments will quickly fall off and the costs are not necessarily offset.

The argument for having a reasonably large stable of courses is that any given course need not be offered too frequently. This allows time for the limited reservoir of distant learners to refill by the time the course is offered again.

Yet courses which fit students' curriculum needs and are properly spaced out may also fail because they were poorly designed, had inferior production values, or perhaps had poor tutors who did not understand distant learners' needs. All of these factors can lead to the puzzling dilemma of high initial enrollments for a given course which then either fall off during the course (poor presentation) or do not attract large enrollments in subsequent offerings (repeated too soon).

These practical matters should lead administrators and instructional technologists to plan carefully their use of funds over a three to five year period in order to maintain that delicate balance between quality, quantity, and frequency.

COST PER STUDENT

Often cited as an important justification for using distance education, the cost per student issue must be carefully examined by those considering distance education programs. There are major differences in calculating costs for students in distance education programs compared with conventional teaching programs. In addition to capital and recurrent expenditures, calculations of fixed and relative costs are necessary. These costs reflect the enrollments in a course and in the total program.

One attractive feature of distance education is the possibility of economy of scale when the high fixed costs for course development are divided by enrollments 10 to 30 times in-class enrollments. That is, the cost per student drops with increased enrollments which can number in the thousands.

Thus for a telecourse with a production cost of $300,000 ($10,000/program) and is taken by 3,000 students in the first year, the cost is $100 per student. If we repeat the course an additional five times and get 2,000 students each time, we can spread the startup costs over 13,000 students and the cost per student drops to $23 each.

Since the course is attracting students, updating and refinement are justified and might cost $100,000, allowing the course to continue in the distance education program's stable for another five showings. This would add 10,000 students to those who already took the course. For our overall cost of $400,000, we enrolled 23,000 students for an average of roughly $17 per student.

The cost drops further if we can distribute the course to Institution B and charge, say, $20 per student. If smaller Institution B had a five year enrollment in our course of only 2,000 students, the income generated is $40,000 and reduces our cost per student to around $15.60.

These startup costs do not include such things as the mass printing of textbooks, study guides, and other items which are directly related to the course enrollment. A printed workbook is required by each student. After a certain figure, there is no economy of scale in printing or in any duplication of individual media such as audiotapes. For each student added, there is an added cost per student whether we expand enrollment by two or two thousand.

Even if distance education methods proved more expensive, reasonable costs above conventional education could be politically justified by the increase in educational excellence and by offering rural schools education equivalent to metropolitan schools. Indeed, providing equal educational opportunities for citizens is a compelling political argument used in many countries.

PRODUCTION CONSORTIUM MEMBERSHIP

Production consortia have been praised earlier as an alternative means of acquiring materials with some input into planning or selecting the courses. This is not always the case with large national consortia, however, and small institutions may have a financial advantage in belonging and using the materials, but feel powerless to specify their curriculum needs.

Production consortia are often promoted by state agencies overseeing schools, colleges, and universities. These allow institutions with similarities in funding, governance, and proximity to come together for joint funding of distance education activities. Leadership by the state agency as a neutral body is essential as jealousies can be more acute within a state than when crossing state lines.

Using our $400,000 production example again, the cost per student would drop dramatically if the costs were shared by, say, four institutions each contributing $100,000 over the lifetime of the course. Examples of long-standing intrastate cooperation are found in the Florida and California community college systems. The Agency for Instructional Technology (AIT) is the best known consortium serving elementary and secondary schools.

USING EXISTING RESOURCES

Distance education offers administrators money saving flexibility to use existing resources in novel ways. An example from the early 1970s was the TV College of Chicago's transfer of its telecourses onto the newly introduced 3/4 inch videocassette format for use in selected branches of the Chicago Public Library. Students themselves could operate the equipment, set their own time schedules for viewing, and not be locked into the current semester's broadcast lineup of courses. Both course materials and facilities paid for by taxpayers were put to additional use with only modest extra costs for the viewing equipment, cassettes, and in-house tape transfer.

This experiment, Study Unlimited, occurred at a time when libraries were rethinking their traditional information archiving role and expanding services to the community. Since then libraries

increasingly have compu. er rooms, software loans, video libraries, and access to on line databases in addition to their audio and print loan collections.

A stroke of genius in Indiana has tied higher education institutions together in a remote classroom network called the Indiana Higher Education Television System (IHETS). This would be a fairly routine, albeit ambitious, technological exercise except that the system is bundled with the sure-to- be-annually-funded Indiana State Police communication network instead of existing as a separate, duplicate system much more vulnerable to cutbacks as part of the higher education appropriation. IHETS has just completed installing optical fiber throughout the network.

The overall lesson is that distance education can take better advantage of existing resources than conventional education which often suffers from "hardening of the categories." Innovative use of people, things, and other institutions seem easier with distance education than with campus based courses.

CHAPTER 7. DISTANCE EDUCATION AT HOME AND ABROAD

Previous chapters examined the many facets of distance education for solving educational problems. This chapter takes a closer look at the distance education experience. Three distance education programs are examined in depth and six others are presented as vignettes. The chapter closes with a brief summary of the international experience.

FULL SERVICE INSTITUTION: OPEN LEARNING AGENCY, VANCOUVER, BRITISH COLUMBIA, CANADA

The Open Learning Agency (OLA) is the closest example to the USA of a self-standing distance education institution using the British Open University model.

Located two hours north of Seattle by car in the Vancouver suburb of Richmond, the OLA creates/adapts its own courses, provides a full range of student services, and is chartered to award its own degrees, diplomas, and certificates. Unlike the BOU, the OLA does not have a large permanent faculty. Instead, it employs a mixture of permanent staff and fee-for-service individuals who are contracted for course writing, tutoring, and advising.

Background. With 366,000 sq. miles, British Columbia is more than double the size of California. But with 2.85 million people, BC has only about 12% of California's population. Vast areas are wilderness, mountains, and plains with sparse settlement. The major higher education institutions are concentrated in the south-western corner of the province (Vancouver and Victoria) where some 70% of the population live.

The OLA is the result of an April, 1988, restructuring of the Open Learning Institute (OLI) and the Knowledge Network into a comprehensive distance education system. The OLA has three major components: the Open College (similar to a community college with adult basic education, certificate, and diploma programs), the Open University (bachelors' degree and professional continuing education programs), and the Knowledge Network. The last is BC's satellite-based educational and

instructional television network available to the learner over a cable television channel or direct satellite downlink.

Canada's federal/provincial system vests strong authority in the provincial ministries of education to provide active leadership and policymaking at all education levels. An example of this viewpoint is British Columbia's Open Learning Consortium, launched in September, 1984, to coordinate the distance learning and extension courses of Simon Fraser University, the University of British Columbia, the University of Victoria and the OLA. Students can ultimately receive the "Open Degree" through the consortium members' courses, enhancing the range of programs available to distance learners.

Institution building. A product of the intense interest in distance education in the late 1970s, the Open Learning Institute was formed in 1978. In designing the OLI, planners drew upon the previous experience of the British Open University and, to a lesser extent, Canada's first self-standing distance education institution, Athabasca University, located in the center of Alberta and established in the early 1970s.

The evolution of the OLA from an "institute" to an "agency" suggests the organic nature of most distance education institutions. Major organizational changes can take place relatively rapidly --especially where: (a) there is a strong centralized government authority to draft and guide the necessary legislation for such changes, (b) the institution has a separate governing board, and (c) there is no large permanent faculty.

British Columbia institutions had developed transfer of credits between institutions in the early 1970s and the mechanism is now routine--an attraction for potential students with prior university/college credits who wish to resume their studies in another institution.

Most recently, the OLA began a "Credit Bank" which includes both course credits accumulated by students over the years and credit for relevant life experiences through a systematic assessment system. While individual institutions can impose their own restrictions and schedules, the distance learner in BC is part of a progressive, integrated open learning system unknown in many places.

Some data. The first degree awarded by the OLA came in 1986--a typical elapsed period since distance education baccalaureate degrees generally take longer to complete than conventional education degrees. A middle-aged school teacher and mother of two received a BA in English and Geography after five years of study while working and meeting family responsibilities.

In fact, only about 10% of the 13,051 students profiled in 1986-87 were aiming for an OLA degree while some 26% were applying the credits earned toward a diploma or degree elsewhere, an example of flexibility in action. Some 21% of the students were studying in OLA certificate programs while 28% were enrolled for general interest. This latter figure is a good example of distance education's strong role in providing lifelong learning.

By 1987, the OLA was offering 410 courses at the university level, 498 in career/technical, and 119 courses in adult basic education (ABE) for a total of 1,027 courses. The percentages of students enrolled in each of these streams was 35% university, 45% career/tech, and 20% ABE. These course offerings are a mixture of pure distance education and extension courses from other cooperating institutions, all leading to OLA certification.

Specifically, the OC programs include courses leading to a high school diploma, and certificate level courses in business, dental assisting, hotel and restaurant management, construction and industrial supervision, electronics, and travel counselling.

The degree programs of the Open University (OU) are in administrative studies, general studies, and general science with other degrees available through other BC universities which also offer extension courses over the Knowledge Network. The OU also has professional certificate and diploma-level programs in administration, applied sciences and natural resources, arts, education, health science, human services, and science.

Costs. Tuition at the OLA are modest. Open University (OU) courses are US$72 for a 3 credit course. Open College costs vary widely, but are basically equivalent to the OU figure. Texts, special fees, and handling fees are additional. Tuition fees are only about 12% of the institutional costs-- the annual grant from the provincial government provided most of the OLA budget.

The 1987 budget provided for US$6.36 million in expenditures for the OU and OC, two thirds of which were for personnel. The Knowledge Network's budget was US$ 3.61 million (40% for network operations) with virtually all the expenditures covered by provincial government grants.

Technology used. Courses are created using a modified team approach. The team consists of the course writer (content specialist), course designer (format, stylistic, and educational expert), and the course consultant (a senior content expert who validates the content). The course designer is a permanent OLA staff member, the other two are paid on a fee-for-service basis. The result is considered an effective, cost efficient method of course development. Where media are specified, production experts are used under contract.

The OLA has put a great deal of time and thought into developing computerized methods to streamline course development and particularly course unit writing where the use of "templates" ensure uniformity of appearance and format. In situations where the course content specialists are all working under individual contracts, there is a strong argument for specifying uniformity of format and visual style.

Early computerization has made the OLA a pioneer in desktop publishing methods. Manuscripts are drafted by course writers, edited by course designers, formatted with graphics along with fonts and overall design, and master plates are created--mostly using a minicomputer system.

Only selected OLA courses use media beyond a study guide and textbooks. Some 98 out of 264 courses (37%) listed in the 1988-89 Open University Calendar use some form of media: televised programs over the Knowledge Network, radio broadcasts, videocassettes, audio recordings, slide sets, lab kits, computer programs, and small group audioconferencing.

In brief...For USA readers seriously examining distance education programs, the OLA provides a nearby view of a self-standing institution serving a variety of educational needs in an innovative manner.

ENGINEERING BY SATELLITE: NATIONAL TECHNOLOGICAL UNIVERSITY

The National Technological University (NTU) is demonstrating how to increase standards of excellence in professional continuing education through remote classroom-based distance education. It is an intriguing example of the consortium- based organizational model for distance education that other professions--especially educational associations-- might wish to scrutinize for goals, methods, and governance.

Background. Started in 1984 as a private, nonprofit institution, NTU is continuing a tradition begun nearly thirty years ago when engineers and scientists started using communications technology to deliver professional development activities (see Chapter 1). Operating a dedicated national satellite network, NTU and AMCEE offer fully accredited master's degrees, support noncredit short courses, and have brought universities, corporations, and government agencies together in a joint effort to improve advanced engineering and scientific education.

Purpose. The educational issues dramatically symbolized by the first beeping Sputnik remain the same today and can be summed up as a question: How can engineers and scientists in rapidly changing technological and organizational environments (a) maintain their technical skills, (b) gain new insights into their managerial responsibilities, and (c) adapt to the personal consequences of volatile corporate shifts?

This . ltifaceted problem is being addressed by the NTU and the AMCEE-affiliated universities working with corporations, the military, and government agencies.

Location. Ft. Collins, Colorado, is the home town for NTU. A small university town (Colorado State--an AMCEE member) some 50 miles north of Denver, Ft. Collins may seem an unlikely place for a university (NTU) whose Board of Trustees is composed mostly of executives from the ranks of its 35 corporate members. Many corporate members are heavyweights in American technology, including Alcoa, AT&T, Boeing, DEC, Kodak, du Pont, General Dynamics, IBM, Whirlpool, Xerox.

NTU's location where the Great Plain[s] [gi]ve way to the Rocky Mountains represents a coming of [U]SA communications infrastructure. It demonstrates the [th]at any agreeable environment reachable by telephone (a[nd] [a]s facsimile and computers), satellite, and Federal Express is as good a location for a national distance education venture as Los Angeles, Dallas, Chicago, or New York. And, directly relevant or not, NTU is also outside the imposing shadows of its corporate members.

Target audience. NTU allows a geographically mobile engineer to be nearly any place in the USA and take courses without having to worry about registering at a local institution, losing credits and transfer, and meeting often rigid residency requirements. NTU courses are available at over 80 sites, including Alaska. The individual can be assured that the courses provided will be of good to excellent quality-- often taught by prominent professors and researchers. In the 1986-87 academic year, NTU enrolled 1,894 students, up from 1,281 the previous year

Course design. NTU courses are traditional classroom-based approaches originating from universities which might not otherwise provide distance education activities. This is consistent with past engineering education efforts. The difference between past efforts and NTU's approach is not in course design innovations, though innovation may come with time, but in the dedicated satellite delivery system and an organizational model which blends universities' services with employers' interest in enhancing their employees' technical education.

AMCEE is the academic anchor for NTU. Founded in 1976, it now has 33 universities whose faculty teach most of the NTU courses. AMCEE and NTU formally share the two channel video network operating on the G-Star 1 satellite. The signals can be received by subscribers on satellite dishes throughout the country. Fifteen of the AMCEE universities have uplinks (earth station transmitting equipment) for originating NTU courses on the satellite channels.

Procedures. NTU, in effect, serves as an active broker between engineers seeking professional education and AMCEE universities which offer the needed courses and certification. Once registered through NTU, students participate in video-linked classes with audio interaction with the institution originating a particular class.

The NTU students are using facilities provided by the corporate subscribers who have installed the proper satellite receiving and remote classroom equipment as a service to their technical staff. Some classes are on tape; most are live but recorded for later review or makeup for those unable to adhere to the normal schedule. Working through the curriculum in one of five MScE programs, the student has tutorial assistance and counselling available, generally by telephone.

The programs offered by NTU are computer engineering, computer science, electrical engineering, engineering management, and manufacturing systems engineering. If there is any lingering doubt that distance education is only for "gut" courses and not for serious study, NTU should be able to change doubters' attitudes. At $365 per course credit hour, the students are indeed serious. NTU is accredited by the North Central Association of Colleges and Schools.

Distant but not open. NTU is an example of the distinction between an "open" learning system and simply a "distant" learning system. All of the students must have met admission requirements for a graduate engineering program. Many of the conventional education trappings are found in the NTU approach--including scheduled class meetings in formal classroom settings. The major difference is that the teacher can be in Chicago and responses for any questions he or she might pose can come from Texas, California, New Mexico, and New Jersey.

The academic calendar of the conventional institutions is basically maintained whereas many open learning systems tend to have greater flexibility in such matters as admissions, deadlines for assignments, and examination schedules.

In brief...The National Technological University demonstrates that master's level courses in some of today's most advanced engineering subjects can be successfully provided to a nationwide audience through satellite-based remote classroom techniques. Drawing upon a tried-and-true formula from past engineering education strategies, NTU has shrewdly guaranteed that degrees earned through its system will be accepted as validly-earned professional education.

FIBER OPTICS IN THE SCHOOLS: MINNESOTA'S MSET

The satellite and conventional telephone delivery systems of NTU and COM-NET, respectively, are now taken for granted by educators and consumers alike. But it is appropriate to look at an excellent example of one of the most intriguing and elegant telecommunication technologies: fiber optics.

Instructional technologists have been tantalized by the concept of fiber optics over the past 20 years, waiting to use a technology for distributing two-way television, data, and multi-channel audio simultaneously.

For distance educators accustomed to receiving fuzzy instructional television programs off air from under-powered PBS stations, or from cable systems with wavy, overlapping signals, fiber optics provide genuine relief with crystal clear pictures. This is partly because the laser-generated light waves carried by the synthetic hair's width quartz fiber are indifferent to electrical noise, static discharges, and other sources of interference endemic to copper cables.

Background. The news from Little Falls, Minnesota, is that the area's eight rural school districts have been linked by a fiber optic -based, two way interactive television network since 1986. Much credit goes to the vision and ingenuity of the local Mid-State Educational Telecommunication Cooperative (MSET) which initiated the effort and now coordinates the system on behalf of the member schools.

MSET-affiliated schools can now provide much needed courses over the network to pupils who would otherwise have been deprived of subjects for which there were no qualified teachers.

Another key part of the example is that the installation of the MSET system was performed by a home town cooperative which won the contract through competitive bidding: the Upsala Telephone Cooperative, serving some 850 customers in the center of Minnesota. The claim is well made that this was the first distance education use of fiber optics in the USA, perhaps the world.

The Minnesota State Department of Education facilitated the project and the State Legislature and local districts paid the installation costs of some $900,000. Equipment costs for each site are estimated at $18,000.

Technology responding to need. The reason for such a system grew out of the classic rural school dilemma: not enough students to justify hiring teachers for subjects just outside the ring of basic courses; needed in particular were foreign language, mathematics, and computer courses.

This is not a unique problem for the MSET service area; about half of Minnesota's school districts enroll fewer than 650 pupils (K-12). But the curriculum demands and educational needs of individuals in the late 20th century are blind to rural and urban distinctions.

This was another case of distance education providing a feasible economic and pedagogical method for offering courses too costly for conventional education methods. Minnesota has faced this kind of problem before. It also understands cooperative services and interconnections between school districts.

Minnesota has been a leader in providing access to computers in the schools, colleges, and universities through the Minnesota Educational Computing Consortium started in 1973. We suspect that having 3M, Univac, Honeywell, Control Data, and Wilson Learning (among others) as prominent corporate citizens has also been an asset in encouraging state support of educational technology.

In 1983, a series of technology demonstration projects was undertaken with the goal of trying out two-way interactive television for teaching between schools. Estimates are that by 1993, more than half of the school districts, including both elementary and secondary schools, will have interactive television links (not all fiber optic). The integration of computers into these networks presents interesting applications of both television and computers for distance learning.

Present system. With the MSET fiber optic network, twelve courses are now taught for high school students: advanced mathematics, modern technology, accounting, geology, astronomy, and two levels

each of German, Spanish, and French. Much of the teaching is done from a conventional classroom setting and distributed live throughout the system.

The teacher steps into the classroom at the normal time and conducts the class much as an NTU or USU instructor would teach. Some extra preparation and consideration for the remote classroom students are required, but nothing like the total preparation needed for telecourse productions. Attention is paid to the se eral cameras but teachers adapt to the contraints--and advantages--of such teaching.

The differences between the fiber optic system and other systems are the ease of using interactive connections-- simply changing channels--and the superior sound and video. It is also possible to plug a set of portable equipment (camera, tripod, sound) into any link in the system to create an instant studio. This technique is planned for use in elementary school applications by MSET.

A single strand of fiber optic can reach up to five miles without a connector and some 35 miles without repeater amplification. The fiber optic network for MSET has been laid underground and, aside from accidental back hoe slicing of the fiber optic cable, should require virtually no maintenance or other upkeep.

Costs. Unlike the leased phone lines of COM-NET and the leased transponder time of NTU, once MSET's fiber optic system was in place, the recurrent costs of the fiber optic connection basically became minimal. The high cost of installation can be offset by the lack of high running costs of the system. Thus if the lifetime of the network is 20 years and the cost was $900,000, this would mean an average of $45,000 per year for the initial installation.

Each of the eight school districts would pay about $5,600 per year if the districts paid the total installation cost equally. With the legislature providing partial funding, some of the expenses were spread over the state revenue base. [More figures are available from the contact person noted at the end of the chapter.]

Ties with the outside. Links are being broadened by MSET to include connections with other schools and higher education through the Lightspan fiber optic network established between

Brainerd area schools and St. Cloud State University. Leadership has come from the Dean of Learning Resources and a progressive Brainerd school teacher. A switching connection can be made in Little Falls which then allows MSET to tap into Lightspan and vice versa.

Special events programming with Brainerd, teacher inservice education and upgrading, and extension courses are offered by St. Cloud State over the Lightspan system. An online computer connection with the library at St. Cloud is in place using the Lightspan system. With three other fiber optic systems being created, Minnesota is piecing together an advanced terrestrial communications network.

Role of State Department of Education. The MSET network has been assisted by the Minnesota State Department of Education whose staff has played a coordinating, facilitating, and cajoling role in encouraging use of educational technology in the state. Staff members have been adept at working out pilot and demonstration projects. The hope is that the projects will be adopted, if successful, by school districts for long term local funding.

The State Department of Education is the channel for certain funds from the legislature to initiate distance education activities. By organizing conferences and quarterly meetings of various technology projects, the department has brought together school policymakers and administrators, teachers, and instructional technologists to learn first hand from their colleagues what sorts of advances are being made in distance education.

Contract issues. One issue raised by the use of two way television in the classroom is how the technology is addressed, if at all, in teachers' contracts. In Minneapolis, a clause in the teachers' contact with the school district goes back to the taping of broadcast programs. It provides for payment when aired and residuals for replays.

The contract issue does not appear to be a deterrent to MSET's member school districts from using their network, but does give a warning to those actively pursuing distance education that it is possible to be inhibited by such regulatory and contractual issues aimed at preventing job loss through technology. In facts, jobs are

usually added by distance education methods.
Future prospects. The expanded applications of interactive television by MSET and others point to primary education uses in addition to more courses for high school students enrolling in specialized vo-tech curricula. Also, teachers and other school personnel will likely take advantage of the more convenient offerings of continuing and professional education classes offered locally by universities tying into the system.

An unplanned, beneficial side effect of interactive television in the schools is that pupils become familiar with learning by television and come to know distance education's advantages and disadvantages. Distance educators are reluctant to admit that many distance education efforts are seen as novelties at first to students. Using distance education in the schools is one way of eliminating the novelty effect at an early age.

In brief... Instructional technologists with long memories are wary about making too many claims for a single technology. In the case of fiber optics, it is possible to confidently claim that this is one of the more important technological advances of the past 20 years. No longer a laboratory demonstration, fiber optics are being put to good use, especially by member schools of the Mid-State Educational Telecommunications Cooperative.

VIGNETTES

TI-IN Satellite Network. Since 1984, TI-IN has been broadcasting advanced placement programs in languages, physics, computer math, computer science and algebra to schools in Texas and a number of other states. For about $20,000, a school joining TI-IN receives a satellite dish, reception device, television monitor, videocassette recorder, and printer. A phone link is available for questions from students and teachers. Homework assignments, handouts, and tests are printed out at the receiving site. In many schools adult volunteers monitor the satellite classes.
Evaluation reports have been favorable. Rural students are now as well prepared to enter college as their cosmopolitan peers. The system allows isolated students to interact with guest speakers and with students in other schools. The taxpayers welcome the additional educational opportunities for a relatively small budgetary allocation.

Project Circuit, Trempealeau County, Wisconsin. This program is cited because it is an undertaking by a county for its own schools. At this writing, nine school districts are participating. The subjects telecast are math, Spanish, and business. Project Circuit uses both cable and microwave with two-way audio and video. An evaluation of the program indicates that Project Circuit students do as well on tests as students in the traditional classrooms. However, these are advanced students and the evaluation points out that the students must have some background in the courses they take.

The Oklahoma State University Public Schools Teleconferencing Network. In 1985, the College of Arts and Sciences at OSU began offering German to the schools of the state by a combination of delivery systems. Satellite transmission of telecasts, specifically designed computer programs, textbooks, and call-in assistance are fully integrated in the carefully designed course. The content is basically the same as the first year of German at OSU. Electronic mail is used to facilitate administration at the local level. the course was pilot tested with 6th through 12th grade students before being made available to the schools. The program is currently being used by 99 out of the 630 districts in the state and by schools in some other states. Physics was recently added to the schedule.

Utah Department of Education Accelerated Learning of Spanish by Satellite. The Utah program uses the same combination of technology as OSU. The primary objective is to provide students with the capability of conversing with native Spanish speakers.

Evaluation is a strong point of this program. After a year of development, the course was pilot tested in a rural school with impressive results. A comprehensive external evaluation was carried on concomitantly with the course. An indication of the success of the program is that several other states have picked it up.

West Hartford Distant Learning Project. West Hartford is a suburban town in Connecticut with two high schools, and like many towns, is experiencing declining enrollment. To provide equitable opportunity to students in both of the schools without reducing the number of courses available, a distant learning project was established on a pilot basis in 1984. Using a cable television channel from the originating school and slow scan television from the receiving school, first year Russian was taught. The pilot was so successful that the offerings have been expanded to include: German, Chinese, and Humanities.

Electronic University Network. Based in San Francisco, the Electronic University Network makes its courses accessible by computer through phone lines. Unlike NTU, most course offerings are on the undergraduate level. Undergraduate degrees can be earned from Regents College of the University of the State of New York and Thomas A. Edison College of New Jersey. A Master of Business Administration can be earned through the John F. Kennedy University in the San Francisco area. A catalog of courses is available.

A Public Private Sector Partnership. The Connecticut State Department of Education and the Southern New England Telephone Company, in cooperation with twenty five local schools, has established demonstration sites for various applications of technology to meet the challenges facing elementary and secondary education through the "Links to Learning" project. The project is providing demonstrations of the applications of voice messaging, the use of a packet switched network for remote data base access, the use of a full motion fiber based television network to inter connect five high schools located in suburban and urban communities and the application of compressed video technology to provide distant learning opportunities between a suburban and urban high school. Evaluation of the various technology and their application to elementary and secondary education is a significant part of the project.

The West Pottsgrove, PA--New South Wales, Australia Connection. The forth and fifth year students in Picton Primary school, New South Wales and students in West Pottsgrove Elementary school, Pennsylvania are in constant touch with each other through electronic mail. The children in each school compose their

messages on microcomputers, then send the messages through a modem to a satellite transmitting station. This project, now several years old, is an example of how telecommunications systems are linking students directly with each other. While trans-world exchanges are hardly commonplace, there is a rapidly growing trend to link students directly with each other and to distant program sources for educational experiences outside traditional institutional constraints.

From elementary school pupils talking with each other by satellite to a consortium of private industry and universities granting graduate degrees, distant education programs of great diversity are re-shaping our educational enterprise. Electronic technology is giving birth to new institutions and re-making old ones. But instructional practice seems to be slower to change.

As if fulfilling McLuhan's observation that a technology tends to imitate the old technology, the instructional method of too many distance education projects is simply transmitting what goes on in a traditional classroom. No doubt more sophisticated instructional strategies will emerge as educators discover the limitations of the conventional classroom model and the greater potential of instruction designed for specific instructional circumstances and the delivery systems involved. It is within the purview of instructional technologists to provide the creative alternatives.

While marketplace economics and decentralized educational policy making have shaped the growth and generally limited the scope of distance education in the USA, other nations with more centralized control have put more funding and effort into developing full scale, self-standing distance education institutions. Often innovative—and occasionally funded by USA foreign aid—such institutions are having an impact on international education trends. Indeed, interest in distance education throughout the world has produced a loose international "movement" which has broad representation and wide applications. Countries outside the USA with distance education programs reported on most frequently include:

In the western hemisphere: Canada, Mexico, Costa Rica, Brazil, Columbia, Venezuela, Peru, and a consortium of Caribbean nations under the University of West Indies.

In Europe: France, the UK, Holland, West Germany, Spain, Sweden, Norway, Finland, various Eastern Bloc countries including East Germany, Hungary, Poland and the Soviet Union.

In the Middle East and Africa: Israel, Jordan, Syria, Turkey, Nigeria, Malawi, Zambia, Kenya, Tanzania, Lesotho, and South Africa.

In Asia and the Pacific region: Pakistan, India, Bangladesh, Sri Lanka, Thailand, Malaysia, Indonesia, Australia, New Zealand, Japan, Peoples Republic of China, Taiwan, Hong Kong, Macau, South Korea, the Philippines, Vietnam, and various Pacific islands including Samoa and Fiji.

Many of these countries have stand-alone, central government-supported distance education institutions awarding certificates, diplomas, and/or degrees. The subjects most often offered include teacher education, business, and public administration. These subject areas reflect how manpower planning orientation of governments which impact on university policy making, particularly in developing nations.

Like most educational systems, each distance education program is highly specific and adapted to the culture, values, needs, and economic circumstances which fostered its inception and growth. But certain experiences and themes seem to transcend national boundaries and cultural settings. Several major lessons emerge:

1. Remote, thinly populated areas can be well served by distance education methods;

2. A substantial number of motivated people shut out of conventional study can provide the basis for a distance education program:

3. If distance education programs are to survive and grow, politicians and bureaucrats must continue to support them;

4. Timely, efficient, friendly learner services are critical for success of the distance education program;

5. Materials and procedures created in Country A can be used by Country B if care and proper adaptation are used in the transfer across boundaries.

Several of these lessons result from negative experiences which are often not recorded but which become part of the oral folklore of a profession.

CHAPTER 8. PRESENT ISSUES IN DISTANCE EDUCATION

The several examples of distance education in action briefly described in the last chapter were selected to represent some of the important issues in distance education as a new decade is about to begin. Instructional technologists can feel genuinely proud that their eclectic borrowings from learning psychology, systems and operations research, communications theory, and the hardware technologies of radio, television and computers have come together in various islands of success under the term distance education. But plenty of issues still require resolution if the modest achievements to date are to meet critical educational demands throughout the USA and the world:

POLICY, LEGAL AND REGULATORY PROBLEMS

In the USA, educational structures are contained within layers of formal policy, legal, and regulatory wrappings: federal, state, county, district, governance board, union, association. We also have the informal, often inelegant, wrappings of culture, tradition, and beliefs. Whatever the wrapping, automatic constraints to change and innovation are built into it.

All of these levels and layers have their agendas (formal and hidden), favorite hobby horses, priorities, election objectives, enemies' lists, and bargaining points. It should come as no surprise if the process of teaching and learning is lost amid these layers of wrappings around the structures. But for the sake of improving education, policy makers should create flexibility within governance and organizational structures which allows distance education and other demonstrably successful innovations to be sustained. (See Heinich [1976, 1985] for specific analysis of the legal, regulatory, and organizational issues related to instructional technology).

For example, a basic question is whether or not distance education courses will be as "legitimate" in earning a certificate, diploma, or degree as conventionally taught courses. In some institutions, the distinction between credit earned through distance education

courses and conventional courses is clearly marked on the student's transcript and the number of distance education credits applicable to a degree program is severely limited.

Restrictions are even more codified in states' public school laws, teachers' union/association contracts, and community expectations as expressed by school boards. Alternatives to face-to-face instruction are unknown in most USA public school systems. This is in keeping with the vital economic role of schools as K-12 child care institutions, quite apart from developing learning skills, imparting knowledge, and transmitting cultural history. Distance education, and instructional technology generally, is sometimes viewed as a threat by many educators since alternative strategies to conventional teaching methods are more efficient and often more effective.

Traditional correspondence study leading to a high school diploma is available from several USA institutions. This writer observed Todd, a typical Utah teenager living in East Africa, using first the Baltimore-based Calvert School junior high correspondence materials and then the University of Nebraska's high school materials. With his parent's presence in the background, Todd spent four hours a day, five days a week, on his studies. This represented the basic learning time for what is considered essential content in the legally established academic curriculum for Nebraska

Some argue that learning mandated subject matter is only a part of our educational system and that young people's socialization is just as important. Yet, if the socialization of young citizens was a major goal for our schools, we would design instruction based on a mixture of cooperative learning, small group interaction, and independent study processes. In many cases, specific restrictions on such approaches translate into unacceptably low levels of learning and socialization, and a great deal of alienation.

A close examination of distance education--and more broadly, instructional technology--leads us to see conventional education cloaked with choking layers of restrictions. Until we can cast off the restrictions, it is unlikely that such desirable efforts as increasing "excellence," providing for genuine "educational reform", and simply achieving better performance will emerge.

RESEARCH AND DEVELOPMENT

R&D is a term usually related to industry and the military. Distance education is fertile ground for conducting educational R&D, as publications from the British Open University demonstrate. While each distance education program will have its own particular research requirements linked with system evaluation, there are general areas where basic, long term research appears necessary in order to advance the concept of distance education as well as specific practices (see also Holmberg, 1987):

1. A return to research on production styles (particularly telecourses and print materials) and interaction of style with course objectives, curriculum, audience factors, costs;

2. Research on key learning and attitudinal factors such as the interactions between motivation, internal and external pacing, and learning styles (especially how different audiences learn from media);

3. Research into better, finer delineations and methodology in formative evaluation stages;

4. Audience research profiles, especially for the "new audiences" referred to above;

5. Policy, governance, and regulatory research which identifies unnecessary constraints on use of distance education and instructional technology;

6. Research which matches organizational factors with type of distance education program/institution; also comparative organizational research between conventional and distance education programs;

7. Research which traces the economic factors in distance education programs and results in more precise analysis and planning models;

8. Research which looks at the structure and function of instructional design methods in a variety of distance education settings;

9. Innovation and diffusion research which describes and analyses how new ideas are approached by a variety of distance education programs;

10. Longitudinal research on students using distance education for varying lengths of time and the effects of such exposure on subsequent learning and achievement;

11. Historical research which traces the evolution of distance education and what was learned in previous eras.

An important outcome of the research suggested above for policy makers and administrators is to avoid having to make key decisions based entirely on intuition and inexact information.

Clear questions of validity arise in much of the USA instructional television production research literature. As an example, production styles for many USA adult telecourses reflect findings from the excellent 1970s Children's Television Workshop research conducted for "Sesame Street" and "Electric Company" productions targeted for under ten year olds. Other production research has been based on subjects not enrolled in the distance education telecourse materials being studied. Yet interaction of production style with target audience expectations is key information in deciding how much money should be spent on a given telecourse.

The flow of research information into distance education programs is translated into curricula decisions, approaches to learning styles, and a myriad of other applied tasks termed "development". While individual distance education programs are usually unable to justify conducting research, it is appropriate for government and foundations to support research leading to development of sounder distance education programs throughout the nation. The ERIC Clearinghouse on Information Resources can collect only what research is reported. A larger plan for research is needed to help distance educators make decisions based on facts rather than fancy.

NEW APPLICATIONS

With improved R&D, refined distance education concepts can expand and better fit patterns of learning for wider audiences. Presently, we don't have much data on how best to provide supplemental education to high school pupils. What should be the role of their present teachers? Data over a number of years indicate that individualized learning using computer terminals has been effective under certain circumstances with inner city, disadvantaged youth. Can those circumstances be replicated and used for distance education?

Single parent families have put the squeeze on leisure and personal time for many people. Teenage pregnancies are unlikely to decrease until there are fundamental changes in society's attitudes to a host of youth, welfare, and health- related issues. Indeed, health and lifestyle issues command more public attention than any other single topic: moking, exercise, DWI, dieting, environmental air and water quality, asbestos, nuclear and other hazardous waste form a litany of concerns of many people. Dealing with these issues are both professionals and concerned citizens who require education and instruction--the seeds for expanded distance education applications if instructional technologists are willing to take the lead and find support from unconventional sources.

Medical and health care professionals are reluctantly jumping into the AIDS information and education campaigns and a host of other public health concerns which require new information and skills by health caregivers. Distance education approaches which stress thoroughness and systematic instruction in medical continuing education has already found a solid niche which can only expand with a rapidly shifting profession.

ORGANIZATION AND LEADERSHIP

With the diversity of institutions using distance education for education and training, most distance education programs are custom-designed to suit the particular institution's commitments. There is clearly a need for greater organizational support for the various clusters of institutions using distance education in their programs-- beyond the existing informal network of professional distance educators. At what point is there a need for an umbrella

organization to provide leadership and professional standards? For some institutions, leadership needs are being met on a limited basis.

Within the community and junior colleges, the AACJC supports the Instructional Telecommunications Consortium (ITC), a national membership organization now over ten years old which has provided an avenue for collaboration, sharing of ideas, and expansion of services. In some states, such as South Carolina, Nebraska, and Florida, public broadcasting networks provide organization and leadership together with vital services for individual institutions.

Leadership for promoting distance education in public school settings is generally the job of state departments of education which are mandated to provide support services to school districts as well as enforce the school laws and regulations. School-college-university collaboration is highly desirable since facilities and expertise can be directly shared--possibly organized around public access channels or a public broadcast station. PBS affiliates are also eligible for services and support from PBS and CPB, a further inducement for collaboration and leadership through public broadcasting.

On the national level, the various professional associations (including AECT) offer limited leadership but not the same focus as was provided previously by the NAEB. The CPB/Annenberg Project and PBS's several service offices for adult learners and schools provide limited program support. Similarly, the Agency for Instruction Technology is a project-by-project enterprise. Expertise in distance education is abundant in all of these groups, but the broad mandate for national, sustained leadership in distance education is lacking.

At the federal level, the disappointment of the University of Mid-America is still painful in the Department of Education. So much investment in UMA came from the now defunct National Institute of Education that a failure measured in nine figures was a temporary impediment to federal funding of distance education. On the brighter side, The United States Department of Education announced, on October 6, 1988, the funding of a comprehensive program of distance education for elementary and secondary

education. Referred to as the Star Schools program, the $19 million dollar project will expand educational opportunities to elementary and secondary students in isolated, small, and/or disadvantaged schools. More than 1,000 schools in 39 states are involved. Four telecommunications partnerships located in different regions will provide the instruction using live, interactive instruction via satellite, computer assisted instruction, and recorded video. Mathematics, science, and foreign languages will be emphasized.

Star Schools funding is for the first year of the two year demonstration project. This program could well be the long sought for general breakthrough for distance education and for technologically delivered instruction in all public schools.

The four grant awards are

- $5.5 million dollars to the Midlands Consortium, a five state partnership based at Oklahoma State University, Stillwater: At least 140 of the neediest schools in a predominantly rural region will be equipped for full participation in satellite broadcasts and other telecommunications programming. Satellite programs in math, science, and foreign languages will be produced and teachers will be trained in using the technology.

- $5.6 million dollars to the TI-IN Network, Inc., based in San Antonio, Texas: Students and teachers in 244 Indian and Chapter I schools (Chapter I serves disadvantaged students) in 16 states will be equipped to receive instructional programming, including two-way satellite broadcasts that use electronic writing tablets and allow student to respond to teachers' questions.

- $2.4 million dollars to Technical Education Research Centers (TERC), Inc., based in Cambridge, Massachusetts: Secondary students in several north central, northeastern, and mid-Atlantic states will work with professional scientists via computer, conducting cooperative "hands-on" experiments such as measuring acid rain levels and weather changes. Materials and technology will be provided to share findings with other students and scientists world-wide. Teachers will be trained to support the student projects.

- $5.6 million dollars to the Satellite Educational Resources Consortium (SERC), based in Columbia, South Carolina: Math, science, and foreign language courses will be offered via satellite three times a day to high school students in 14 participating states and cities in two other states. All courses will provide for live audio interaction between students and the television teacher and tutors. Graduate courses and in-service training will be offered to teachers of these subjects using the same two-way interaction. To reach students and teachers throughout the states, nearly 700 downlinks will be installed, ranging in size from a reception site that will serve a small, isolated school to a site that will serve an entire school district.

The outlook in other federal agencies is optimistic. Considerable long term support for distance education exists throughout the Department of Defense. Distance education projects of the State Department's US Agency for International Development (USAID) in developing nations have been noteworthy for their diversity and scope. This paradox of one federal agency ignoring a significant education and training system while other agencies pioneer new methods is not unique to the USA, but our system appears to discourage dissemination of information about DOD and USAID's solid achievements.

Regular international meetings on distance education and the existence of four distance education journals (originating in the UK, Australia, Canada, and the USA) plus other newsletters and publications make the international scene lively and encouraging. Lacking a more coherent focus and leadership, the USA may continue to be half a step behind other nations in conceptual and applied distance education methods. This is not a calamity, but is wasteful of resources. A number of solutions to this vacuum of organization and leadership in distance education can be suggested, but must be discussed in a different publication.

ABBREVIATIONS AND ACRONYMS USED IN TEXT

AACJC American Association of Community and Junior Colleges. One Dupont Circle, Washington, DC 20036. (202) 293-7050

AECT Association for Educational Communication and Technology. 1126 16th St. NW, Washington, DC 20036. (202) 466-4780

AED Academy for Educational Development. 1255 23rd St. NW, Washington, DC 20037. (202) 862-1900. Contractor for several major distance education projects sponsored by USAID in developing nations.

AIT Agency for Instructional Technology (formerly Agency for Instructional Television), Box A, Bloomington, Indiana 47402. (812) 339-2203

BBC British Broadcasting Corporation. Broadcasting House, London, W1N, England, United Kingdom.

BOCES Board of Cooperative Educational Services (various locations, New York State).

BOU British Open University. Walton Hall, Milton Keynes, MK7 6AA, England, United Kingdom. (Also referred to as UKOU: United Kingdom Open University).

CPB Corporation for Public Broadcasting. 1111 16th St. NW, Washington, DC 20036 (202) 955-5100

CTW Children's Television Workshop. 1 Lincoln Plaza, New York City, NY 10023. (212) 595-3456

DAVI Department of Audiovisual Instruction (former name of AECT, see above).

ERIC Educational Resources and Information Center. Federally supported, subject specific clearinghouses located in various institutions around the nation. For distance education, the ERIC Clearinghouse on Information Resources is most relevant. The address is c/o School of Education, Syracuse University, Syracuse, NY 13210. (315) 423-3640.

ICDE International Council on Distance Education (formerly International Council on Correspondence Study). Secretariat located at Athabasca University, Box 10,000, Athabasca, Alberta, T0G 2RO Canada. (403) 675-6111

ICDL International Center for Distance Learning. Supported by the United Nations University and located at BOU (see above).

ICS International Correspondence Schools. Oak and Pawnee Sts., Scranton, PA 18515. (717) 342-7701

IHETS Indiana Higher Education Telecommunication System, Indianapolis, Indiana 46223, (317) 263-8900

ITC Instructional Television Consortium. An activity of the AACJC (see above).

ITFS Instructional Television Fixed Service. Low powered, low cost line of sight microwave TV and data distribution system often used by schools and colleges.

K-12 Kindergarten through 12th grade, an abbreviated way of expressing school-level education in the USA system.

LRC Learning resource center. Often the name for combined audiovisual services and media print library.

NAEB National Association of Educational Broadcasters (disbanded).

NDEA National Defense Education Act (passed in late 1950s).

NPR National Public Radio. Information, entertainment, educational radio network subscribed to by public radio stations. 2025 M St. NW, Washington, DC 20036. (202) 822-2000.

NTU National Technological University. Consortium of universities and businesses offering advanced engineering degrees. 601 S. Howes, Ft. Collins, Colorado 80521. (303) 484-6050.

OLA Open Learning Agency, Box 94000, Richmond, British Columbia, V6Y 2A2, Canada. (604) 660-2242.

OLI Open Learning Institute. (See OLA above).
PBS Public Broadcasting Service. Public affairs, cultural and educational television network supported by public broadcasting member stations, foundations, private business, and CPB. Maintains an Adult Learners Service. 1320 Braddock Pl., Alexandria, VA 22314. (703) 739-5000.

R&D Research and development.

SUN State University of Nebraska. Distance learning institution established in early 1970s in Lincoln, Nebraska; succeeded by UMA (see below).

UMA University of Mid-America. Major USA distance education project, closed in early 1980s after twelve years; based in Lincoln, Nebraska.

USAID United States Agency for International Development, Washington, D.C. 20523. Federal agency responsible for foreign aid and technical assistance to third world countries. Also referred to as AID.

USU Utah State University, Logan, Utah 84322.

VCR Video cassette recorder.

SELECT GLOSSARY OF TERMS

Note: The following terms are defined in the context of this booklet and do not necessarily correspond with established AECT or other standardized definitions.

AUDIO CONFERENCING Use of telephone to link two or more classrooms with an audio signal. This is the simplest of the several types of teleconferencing techniques. By using microphones and loudspeakers, audio interaction between sites is possible. See also: COMPUTER CONFERENCING, TELECONFERENCING, VIDEO CONFERENCING.

CLASSROOM-BASED EDUCATION Conventionally conducted education where a teacher meets face-to-face with a group of students on a regular basis in a room specifically designed for the group learning process. See also: CONVENTIONAL EDUCATION

COMPUTER CONFERENCING Use of computers which are linked through modems and telephone lines (or other means) to each other. Computer users are allowed to freely or systematically interact to share ideas and concepts. With screen projection equipment, large groups can view the conferencing process. See also: AUDIO CONFERENCING, TELECONFERENCING, VIDEO CONFERENCING

CONVENTIONAL EDUCATION In this context, education which is conducted in a classroom with direct contact between students and a teacher but no links with other classrooms as in teleconferencing. There can be great diversity within the four walls, including innovative methods, use of educational media, and systematic instructional design.

CONSORTIUM A formal or informal partnership of institutions, organizations, or companies to carry out specific goals which benefit the member groups. The consortium can be formed to accomplish a single task (e.g. creating a telecourse) and then dissolving, or sustained indefinitely to provide services to old and new members.

CORRESPONDENCE STUDY The traditional term for non-classroom, home or work-based study using printed materials such as a study guide and textbook with regular written assignments graded by a tutor or course instructor. Such activities usually lead to an examination at the completion of the course. With the addition of instructional development procedures and use of educational media, the term correspondence study has shifted to "distance learning" (see below) or other terms.

COURSE TEAM The multidisciplinary group which plans and produces a distance education course. Content, instructional design, media (video, audio, graphic arts), student assessment, evaluation, and reprographic specialists may be involved in the various stages of course development which likely follows an instructional development model.

COURSEWARE The various materials in the form of print, media, laboratory kits, etc. which are the tangible components of a distance education course.

DELIVERY SYSTEM The system which provides a two way flow of information, administrative, and academic materials between a distance education program and its students. The delivery system methods may include postal and courier services, broadcasting stations, cable networks, newspapers, satellites, telephone, teleconferencing, and computer systems.

DISTANCE EDUCATION The organizational and pedagogical methods of providing systematic education at a distance using various forms of educational and communications technology. The teacher and student are physically separated in space and (often) in time since learning materials (print, media, computer programs) are prepared in advance. Student's use the materials places of their own choosing. Communications media are to bridge the space and time gap and provide the major interface between a teacher and students. Occasional contact with other students and tutors may be designed into the system. See Chapter 1 for a more formal definition and discussion. See also: CORRESPONDENCE STUDY, DISTANCE LEARNING, DISTANCE TEACHING, CLASSROOM -BASED EDUCATION, CONVENTIONAL EDUCATION

DISTANCE LEARNING Learning through distance education using systematically created materials, occasional tutor contact, and communications media. Such learning requires efficient time management, motivation, and independent study skills. See also: INDEPENDENT STUDY

DISTANCE TEACHING The teacher's perspective of distance education whereby courses are prepared wholly in advance of their use. Direct contact with students is minimal, if at all. Often distance teaching is a team effort consisting of specialists in content, media, evaluation, and instructional technology (see COURSE TEAM).

DUAL-MODE INSTITUTION Conventional institutions which offer distance education programs through an extension division or separate distance education unit are sometimes called dual- mode institutions.

EDUCATIONAL TECHNOLOGY See INSTRUCTIONAL TECHNOLOGY

ELECTRONIC MAIL A method of communicating messages using computers which provide "electronic mail boxes" for users. The simplest systems used by some distance education programs are electronic bulletin boards; the more complex are commercially operated systems, some with hundreds of thousands of subscribers, such as MCI Mail, the Source, CompuServe, Easy Link, Bitnet, and AECT's Tech Central.

FIBER OPTICS A high technology replacement for copper wires and cables used to carry voice (telephone and audio), data, and video signals. The fiber is an ultra pure quartz strand the thickness of a hair. Information is transmitted by laser-generated pulsed light along the fiber rather than by electrical pulses along a wire. The result is an interference-free, multiple channel means to deliver audio, video, and data at the same time to the same place using tiny strands of glass.

FORMATIVE EVALUATION Evaluation conducted during the development period of courses and instructional materials with the intention of improving the final version by eliminating errors, minimizing ambiguity, and maximizing effectiveness. Formative evaluation is a necessity for distance education systems because of the difficulties of rectifying mistakes once a course and its materials begin use by large numbers of students. See also: SUMMATIVE EVALUATION.

HARDWARE The equipment and machinery used in instructional technology and computer systems (projectors, printers, monitors) and hence distance education systems is loosely called hardware to distinguish from the materials (films, slides, computer programs) which are known as SOFTWARE (see below).

HOME STUDY A term often used in the past as a synonym for correspondence study (see above) and now typically meaning some form of distance education (see above).

INDEPENDENT LEARNING The term for learning outside of conventional classroom-based instruction. This can be in the context of a formal program within a conventional or distance education institution (see INDEPENDENT STUDY and DISTANCE LEARNING). It can also mean an informal plan of learning set up entirely by the learner to achieve some specific goal such as how to tune an automobile engine.

INDEPENDENT STUDY Usually a structured but individualized course of study designed to meet an individual's personal educational needs and goals within a larger program of study. Advanced graduate study is often "independent study" When independent study is undertaken mostly through distance education courses, it more precisely termed "distance learning" (see above) Independent study in a conventional education context often means guided readings, library research, occasional individual tutorials, possibly attendance at seminars and lectures, and creation and defense of a paper on a specific subject.

INSTRUCTIONAL DESIGN That part of the instructional development process (see below) which specifies the components of an instructional system based on the detailed objectives of a course or program.

INSTRUCTIONAL DEVELOPMENT Systematic procedures to translate curriculum plans into courses, materials, and student assessment methods, and to validate the courses during various stages of their development.

INSTRUCTIONAL SYSTEM A carefully structured and managed system of teaching and learning components which are selected and used to achieve specified outcomes. Distance education in some institutions represents the best available examples of instructional design and instructional development in creating instructional systems.

INSTRUCTIONAL TECHNOLOGY A multi-disciplinary field in education and training which draws upon a wide range of psychological and technological tools and principles to maximize learning. (Also called educational technology)

INTERACTIVE VIDEO A system of individualized instruction which uses videodisc and computer technology to present information which is tailored to the responses of the learner through branching techniques. See also: VIDEODISC

K-12 In the USA, shorthand designation for education from kindergarten to 12th grade, the final year of secondary school.

LEARNING PACKAGE A self-contained course or portion of a course which includes all the necessary components to teach the course in a conventional classroom setting by an instructor or, if so designed, in a distance education program used by the student.

MEDIA The various forms and channels of communicating information, entertainment, knowledge, skills, and attitudes. General media are thought of as radio and audio recordings, film, television and video recordings, and printed materials such as newspapers and magazines. INSTRUCTIONAL MEDIA (also called EDUCATIONAL MEDIA) specifically refer to those forms media equipment and materials used in teaching and learning.

MODULE A unit of study which can be combined with other modules to form a complete course of study. In distance education, modules contain all of the necessary study materials needed by the student to meet a well defined set of objectives. Modules may comprise a LEARNING PACKAGE (see above).

OPEN LEARNING An approach to education which allows for a variety of non-traditional means of achieving educational goals by a student. Typically, "open" refers to open entry which has few restrictions of age or past educational experience. The term was used in the late 1960s and 1970s as an umbrella word to indicate distance education, independent study, credit by examination (CLEP test), and credit for life experience.

OPEN UNIVERSITY/OPEN COLLEGE Those institutions which provide educational opportunities without imposing restrictive age, examination, or previous education conditions requirements for matriculation. Open colleges may be part of conventional institutions. Many distance education universities have adopted the term from the British Open University.

PACING A method of externally organizing the progress of a student through a distance education course by imposing deadlines for assignments, specific schedules for broadcasts, and setting a date for course completion. Some distance education programs have little, if any, pacing while others follow a typical semester's schedule.

REMOTE CLASSROOM A classroom, seminar room, lecture hall, auditorium, laboratory, etc. which is part of a network of other classrooms linked by one of the several forms of teleconferencing (see below) techniques. This allows one teacher or presenter to reach a number of students and sites in the same building or in another part of the world. The links can be by telephone, coaxial cable microwave (especially ITFS--see Abbreviations), satellite, fiber optic, or radio. See also: AUDIO CONFERENCING, TELECONFERENCING, VIDEO CONFERENCING.

SELF-STANDING INSTITUTION In this context, a distance learning institution which has its own legal status, governance board, and can award its own degrees in contrast with distance education programs which are part of dual-mode institutions (see above) embracing both conventional and distance education.

SLOW SCAN TELEVISION A technique of transmitting still video pictures (face of instructor, graphic materials, pictorial matter) by ordinary telephone lines to produce a picture similar to a good quality freeze frame on a video recorder. The picture can change every 6 to 30 seconds depending upon equipment. Slow scan is used for linking remote classrooms together with a base where conventional television links such as microwave are not feasible. A second telephone line is required to allow audio interaction between the various sites.

SOFTWARE The materials which contain the information and content of a course, module, or unit and which usually require some type of equipment or machinery (HARDWARE, see above) to make them usable. Typically, film, video and audio recordings, 35mm slides, overhead transparencies, and computer programs are termed "software" by instructional technologists. Printed materials are also referred to as software.

STUDENT ASSESSMENT The preferred term for "student evaluation" since the purpose is to determine a student's academic progress by examinations, quizzes, self-correcting techniques, written assignments, projects, and systematic observation.

STUDENT SERVICES The administrative division of a distance education program which is the interface with students the institution. A student services division arranges for information and registration, maintains records (transcripts), may coordinate tutorials, distributes career and study information, may arrange for examinations, and generally provides the main administrative link between institution and student. See also: DELIVERY SYSTEM

SUMMATIVE EVALUATION Evaluation of materials and courses following their final version, distribution, and usage. Evaluation during the stages of development is called FORMATIVE EVALUATION (see above).

TELECONFERENCING The general term for linking remote sites/classrooms by video and/or audio connections. More precise terminology is AUDIO CONFERENCING (see above) for audio-only links and VIDEO CONFERENCING (see below) where video is made available at remote sites from the originating site.

TELECOURSE A course presented by television using broadcast, cable, microwave (see ITFS in Abbreviations, next section), or video distribution. The course may be specially created or adapted from existing educational programs (see WRAP AROUND). The televised portion of the courses often serves to illustrate and amplify content contained in a course textbook, study guide, and exercises.

TUTORIAL In distance education, the provision for face-to- face and/or telephone contact with a subject specialist assigned to the course. The tutor may meet students individually or in groups during the scheduling of a course. Some tutorial programs use electronic mail (see above) for their communication with students.

VIDEO CONFERENCING Use of communications satellite technology to link various remote classrooms with an originating site--a studio or another classroom equipped for television origination. The connection also includes audio linkage which allows any site to originate an audio signal. This configuration is called one way video, two way or interactive audio. Advances in technology such as fiber optics are now allowing fully interactive video and audio linkages. A partial stage of VIDEO CONFERENCING uses slow scan television (see above) which distributes freeze frame pictures and interactive audio originating from any site with two telephone lines.

VIDEO DISC A specially configured plastic disc capable of storing data, text, still pictures, moving pictures, and audio. The information is read by a laser beam reflected off the mirrored surface (hence sometimes called "Laser Disc"). Computer access to any stored item is virtually instantaneous and thus the videodisc is used as the information storage base for interactive video learning systems (see above).

WRAP AROUND TELECOURSE Refers to the post hoc creation of a telecourse based on an existing television program series which was not specifically designed as telecourses. Instructor and student guides are created, an item bank of examination questions is developed, and if necessary a textbook is written. One practical purpose behind creating wrap around courses is to provide a high production value telecourse without the user institutions bearing the high costs of the a well known presenter, location production expenses, elaborate special effects, and other costs.

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Centers of Activity

Below are listed several general references to centers of activity, the addresses of programs cited in the text, and an announcement of a massive distance education program funded by the federal government.

Two recent ERIC documents are recommended to anyone interested in K-12 distance education programs. The first one has a state by state compilation of past and present programs.

- ED 291 351 Quinn, W. and Williams, D.D. Statewide Evaluation Report - Productivity Project Studies Related to Improved Use of Technology to Extend Programs. Sub-Report Three: Survey of Technology Projects Throughout the United States. Prepared by Wasatch Institute for Research and Evaluation, Logan Utah for the Utah State Office of Education. January 1987.

- ED 291 350 is Sub-Report Two: Distance Education in elementary and Secondary Schools. A Review of the Literature.

- Accelerated Learning of Spanish by Satellite, Utah Office of Education., 200 East 500 South Street, Salt Lake City, Utah 84111

- Electronic University Network, 11150 Sansome Street, San Francisco, California 94111

- Links To Learning, SNET, 227 Church Street, New Haven, Connecticut 06506

- MSET, Upsala Area High School, Upsala, Minnesota 58384
- National Technological University, 601 South Howes, Fort Collins, Colorado 80512
- Oklahoma State University Public Schools Telecommunications Network, College of Arts and Sciences, Stillwater, Oklahoma 74074
- Open Learning Agency, Box 94000, Richmond, British Columbia, V6Y 2A2, Canada
- Project Circuit, Trempealeau School District, Trempealeau, Wisconsin 54661
- TI-IN, 1000 Central Parkway North, Suite 190, San Antonio, Texas 78232
- West Hartford Public Schools, 28 South Main Street, West Hartford, Connecticut 06107
- West Pottsgrove Elementary School, Grosstown Road, Stowe, Pennsylvania 19464

Each year (usually the October issue), the magazine Electronic Learning reports state by state developments in computer usage and telecomputer networks. While not specifically devoted to distance education, these reports indicate feasibility of distance education programs in each state.